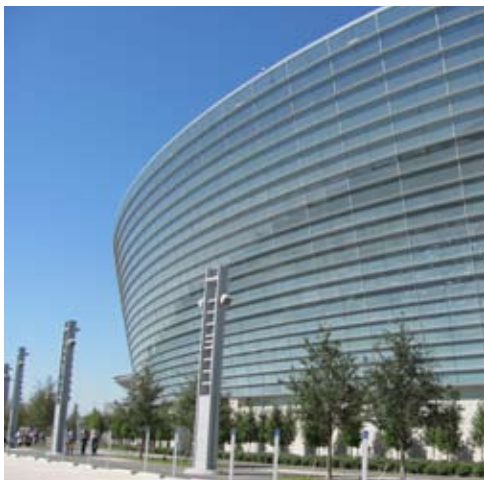
The Winning Choice For Stadium Sound

R-Series Weather-Resistant Athletic Loudspeaker Systems



Community®

WORLD-CLASS VENUES USE COMMUNITY… SO CAN YOU!

Community is proud to be the loudspeaker system of choice for high school and college football stadiums coast to coast. Our loudspeaker systems are installed in thousands of sports venues worldwide, from local high school gymnasiums to premiere college and NFL stadiums. R-Series are recognized for high intelligibility, musical sound quality and long-term dependability. Backed by an industry best 5-year product warranty and 15-year warranty on the structural integrity of its enclosure, each R-Series loudspeaker is engineered to perform in the harshest environmental conditions.

Weather-Resistant Construction

All R-Series loudspeakers are proven leaders in outdoor performance. From local athletic fields to college campuses to water parks to NASCAR motor speedways, R-Series loudspeakers are utilized for their high quality speech and music reproduction coupled with unquestioned product longevity. All R-Series are built to withstand the toughest and most extreme weather conditions imaginable. These loudspeakers are commonly used on ski slopes and winter resorts, as well as on beaches and cruise ships.

Versatile Performance

The R-Series features tightly controlled dispersion patterns and long projection distances. The “throw distance” of an R6 loudspeaker, for example, is 190 yards (73 meters) at 96 decibels, much longer than that of conventional paging horns. At the same time, tight pattern control allows the sound to travel only where it is directed and away from neighboring areas.

High Intelligibility

All Community R-Series loudspeakers are highly intelligible. In any public area, college campus or large venue, intelligibility becomes critical amidst the panic of a dangerous situation or sudden evacuation. With R-Series, instructions come through loud and clear in all types of emergency communications.

Systems to Fit Any Budget

With 22 models to choose from, ranging from short throw with wide coverage angles to ultra-narrow, long throw systems, the task of designing an acoustically and economically effective sound system with world-class entertainment-quality sound has never been easier.

Community R-Series leads the industry in high-performance all-weather professional loudspeakers. The introduction of the R2 in 1998 became an important advance in outdoor sound systems, and the budget-friendly R-Series has quickly become the standard for high school football stadiums and athletic venues. High quality voice reproduction and music performance normally associated only with indoor systems are now available for outdoor use. With Community R-Series, your fans will enjoy world-class entertainment-quality sound and your Friday night football game will never be the same.

R-Series Meet the Players

R.25
2-way, full-range
100 Hz to 16 kHz
LF 1 x 8"
HF 1 x ¾"
200W RMS
500W Program

R.5
2-way, full-range
85 Hz to 16 kHz
LF 1 x 12"
HF 1 x 1"
200W RMS
500W Program

R.5COAX
2-way, full-range
80 Hz to 18 kHz
LF 1 x 12"
HF 1 x 1"
200W RMS
500W Program

R.5SUB
Subwoofer
50 Hz to 100 Hz
LF 1 x 12"
200W RMS
500W Program

R.5HP
3-way, full-range
85 Hz to 16 kHz
LF 1 x 12"
MF 1 x 2"
HF 1 x 1"
200W RMS
500W Program

R1
2-way, full-range
90 Hz to 16 kHz
LF 1 x 12"
HF 1 x 1"
200W RMS
500W Program

R2
3-way, full-range
70 Hz to 16 kHz
LF 2 x 12"
MF 1 x 2"
HF 1 x 1"
400W RMS
1000W Program
Model R2-52Z features MF 2 x 2"

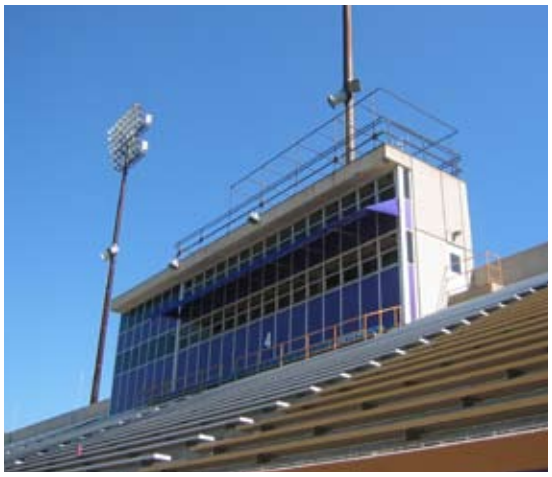
R2SUB
Subwoofer
40 Hz to 150 Hz
LF 2 x 12"
400W RMS
1000W Program

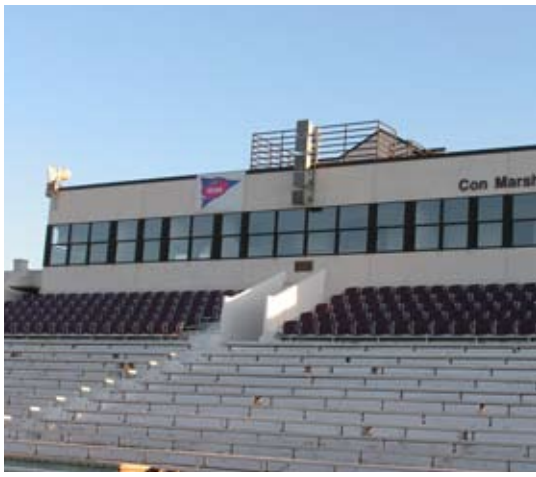
R6-51
3-way, full-range
50 Hz to 16 kHz
LF 6 x 12"
MF 6 x 2"
HF 6 x 1"
1200W RMS
3000W Program

R6-Basshorn
Bass horn system
55 Hz to 450 Hz
LF 6 x 12"
1200W RMS
3000W Program

RMG-200A
Voice-range
horn system
400 Hz to 8 kHz
MF 1 x 2"
75W RMS
120W Program

RSH-462
FocusedArray™
horn system
400 Hz to 8 kHz
MF 4 x 2"
300W RMS
750W Program





Community Professional Loudspeakers
333 East Fifth Street, Chester, PA 19013-4511 U.S.A.
Phone +1 610 876-3400 • Fax +1 610 874-0190
www.community**pro**.com

ATHBR 15FEB10

R-Series

Loudspeakers for Emergency Management,
High Level Communications and Alerting Systems

Community®

R-Series

R.25
Two-way, full-range
100 Hz to 16 kHz
LF 1 x 8", HF 1 x ¾"
IP55W*

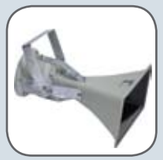
R.5
Two-way, full-range
85 Hz to 16 kHz
LF 1 x 12", HF 1 x 1"
IP55W*

R.5HP
Three-way, full-range
85 Hz to 16 kHz
LF 1 x 12", MF 1 x 2", HF 1 x 1"
IP55W*

R1
Two-way, full-range
90 Hz to 16 kHz
LF 1 x 12", HF 1 x 1"
IP55W*

R2
Three-way, full-range
70 Hz to 16 kHz
LF 2 x 12", MF 1 x 2" HF 1 x 1"
IP55W*
Model R2-52Z features MF 2 x 2"

R6-51
Three-way, full-range
50 Hz to 16 kHz
LF 6 x 12", MF 6 x 2" HF 6 x 1"
IP55W*



RMG-200A
Voice-range horn system
400 Hz to 8 kHz
MF 1 x 2"
IP65W*

RSH-462
FocusedArray™ horn system
400 Hz to 8 kHz
MF 4 x 2"
IP65W*

*A minimum 5 degree downward aiming angle is recommended.

COMMUNICATE WITH CONFIDENCE

The Community R-Series leads the industry in high-performance all-weather professional loudspeakers. When the industrial grade R2 was introduced in 1998, it became an important advance in outdoor sound systems. For the first time, high quality voice reproduction and music performance normally associated only with indoor systems were now available for outdoor use. Since then, the R2 has been installed in sports facilities all over the United States, as well as in NFL and Olympic venues worldwide. The R-Series family has been expanded to include compact weather-resistant models, large bass horns and high SPL voice range announcement systems.

What sets the R-Series apart?

High Intelligibility. All Community R-Series loudspeakers are highly intelligible. In any public area, college campus or large venue, intelligibility becomes critical amidst the panic of a dangerous situation or sudden evacuation. With the R-Series, instructions come through loud and clear in all types of emergency communications.

Versatile Performance. The R-Series features tightly controlled dispersion patterns and long projection distances. The "throw distance" of an RSH-462, for example, is over 240 yards (218 meters) at 96 decibels, much longer than that of conventional paging horns. At the same time, tight pattern control allows the sound to travel only where it is directed and away from neighboring areas.

Weather-Resistant Construction. All R-Series loudspeakers are proven leaders in outdoor performance. From local athletic fields to college campuses to water parks to NASCAR motor speedways, R-Series loudspeakers are utilized for their high quality speech and music reproduction coupled with unquestioned product longevity. All R-Series are built to withstand the toughest and most extreme weather conditions imaginable. These loudspeakers are commonly used on ski slopes and winter resorts, as well as on beaches and Caribbean cruise ships.

R.5 loudspeakers are strategically placed around the city of Venice as part of its flood warning and evacuation system.

EMERGENCY MANAGEMENT, HIGH LEVEL COMMUNICATIONS AND ALERTING SYSTEMS

Though designed to handle harsh environments, R-Series is the perfect choice for many less demanding conditions as well, as evidenced by the vast number of units installed in convention centers, gymnasiums, airports and other indoor venues. With 22 models to choose from, ranging from short throw with wide coverage angles to ultra-narrow, long throw systems, the task of designing an acoustically and economically effective sound system for entertainment and mass notification systems has never been easier.

Smaller R-Series products are rotationally molded of polyethylene, while the larger models are built from hand-laid glass fiber composites. All medium and long throw R-Series systems feature horn loading in all frequency bands. The acclaimed R2 is offered with no less than three symmetric horn patterns and two asymmetric horn patterns, and all models with the exception of R6, RMG and RSH are equipped with internal protection circuitry to guard against abusive overdrive. All models are available in architectural light grey, but custom colors are also available for volume purchases. R-Series is protected by a 5-year product warranty and 15-year enclosure warranty.

In summary, the R-Series family can singularly, or in combination, handle almost any large-scale public address task imaginable. It is the clear choice for short, medium, and long throw applications where high power speech and music reinforcement is required. The impressive ratings, genuine musicality, extremely high intelligibility and speech clarity of R-Series solve problems that no other loudspeaker line can solve, both functionally and economically.

RSH-462 loudspeakers provide important safety announcements to incoming vessels at Icdas Jetty port in Turkey.

Benefits of R-Series for Mass Notification Systems

- High intelligibility so your message is loud and clear
- Tightly controlled dispersion puts sound only where you want it
- Long projection capability with high SPL (Sound Pressure Level)
- Weather-resistant construction for outdoor use
- Corrosion-resistant steel hardware, fasteners and mounting brackets
- Versatile performance for combined entertainment, paging and emergency announcement systems
- Versatile models for short, medium and long throw applications
- Protection circuitry in R.25, R.5, R1 and R2 models
- Autoformer versions available for distributed 70V/100V systems
- Industry-best 5-year product warranty and 15-year enclosure warranty
- Proven performance in world-class venues worldwide

Applications and Users

- Voice warning communications systems
- Industrial paging and alerting systems
- Military camps and military buildings
- Public transportation
- Power plants
- Athletic venues and sports stadiums
- Beach and harbor warning systems
- Theme and amusement parks
- Convention centers
- Factories and warehouses
- Campus alarm systems
- Government facilities throughout Washington, DC
- NASA/USA Space Program facilities including the Kennedy Space Center launch pad and Vehicle Assembly Building

Community Professional Loudspeakers
333 East Fifth Street, Chester, PA 19013-4511 U.S.A.
Phone +1 610 876-3400 • Fax +1 610 874-0190
www.community**pro**.com

RSECBR20100113

R-Series

Application Guide

Community®

THE COMMUNITY R-SERIES

R.25

Two-way, full-range
100 Hz to 16 kHz
LF 1 x 8", HF 1 x ¾"
200W RMS, 500W PGM, 8 ohms
Available coverage pattern: 90° x 40°

For portable systems and as short throw fill speakers.

R.5

Two-way, full-range
85 Hz to 16 kHz
LF 1 x 12", HF 1 x 1"
200W RMS, 500W PGM, 8 ohms
Available coverage patterns: 60° x 60°, 90° x 40°, 90° x 90°

For short-to-medium throw applications like gyms and small seating areas.

R.5COAX

Two-way, full-range, 80 Hz to 18 kHz
LF 1 x 12", HF 1 x 1"
200W RMS, 500W PGM, 8 ohms
Available coverage patterns: 60° x 60°, 90° x 90°

For short-throw applications such as concession areas, gyms and as fill speakers.

R.5HP

Three-way, full-range, 85 Hz to 16 kHz
LF 1 x 12", MF 1 x 2", HF 1 x 1"
200W RMS, 500W PGM, 6 ohms
Available coverage pattern: 60° x 40°

For high level speech reinforcement and music reproduction.

R.5SUB

Subwoofer, 45 Hz to 150 Hz
LF 1 x 12"
200W RMS, 500W PGM, 6 ohms

For near-field low frequency reinforcement.

R1

Two-way, full-range, 90 Hz to 16 kHz
LF 1 x 12", HF 1 x 1"
200W RMS, 500W PGM, 8 ohms
Available coverage patterns: 60° x 40°, 60° x 60°, 90° x 94°

For medium-throw indoor and outdoor applications.

R2

Three-way, full-range, 70 Hz to 16 kHz
LF 2 x 12", MF 1 x 2", HF 1 x 1"
(Model R2-52Z features MF 2 x 2")
400W RMS, 1000W PGM, 4 ohms
Available coverage patterns: 50° x 20°, 70° x 70°, 90° x 40°, 40-70° x 40°, 60-90° x 40°

For short-to-long throw applications requiring full bandwidth reproduction.

R2SUB

Subwoofer, 30 Hz to 500 Hz
LF 2 x 12"
400W RMS, 1000W PGM, 4 ohms

For powerful low frequency reinforcement.

R6-51

Three-way, full-range
50 Hz to 16 kHz
LF 6 x 12", MF 6 x 2", HF 6 x 1"
LF: 1200W RMS, 4 ohms
MF: 450W RMS, 8 ohms
HF: 300W RMS, 8 ohms

For high-level, very long throw full-range reinforcement.

R6-Basshorn

Basshorn 6 x 12"
45 Hz to 500 Hz
1200W RMS, 3000W PGM, 4 ohms

For high-level, very long throw low frequency reinforcement.

RMG-200A

Voice-range horn system
400 Hz to 8 kHz
MF 1 x 2"
75W RMS, 120W PGM, 11 ohms

For voice-range announcement.

RSH-462

Exponential FocusedArray™ horn system
400 Hz to 8 kHz
MF 4 x 2"
300W RMS, 750W PGM, 11 ohms

For voice-range announcement and high-level paging.

TABLE OF CONTENTS

The Community R-Series ..... Page 2

Introduction to R-Series ..... Page 4-6

Installation, Application Notes and Safety ..... Page 7-9

System Optimization ..... Page 10

Throw Distance Chart ..... Page 11

Baseball Field #1 ..... Page 12-13

Baseball Field #2 ..... Page 14-15

Baseball Field #3 ..... Page 16-17

Small Football Field #1 ..... Page 18-19

Small Football Field #2 ..... Page 20-21

Small Football Field #3 ..... Page 22-23

Large Football Field #1 ..... Page 24-25

Large Football Field #2 ..... Page 26-27

Large Football Field #3 ..... Page 28-29

High-School Gymnasium #1A ..... Page 30-31

High-School Gymnasium #1B ..... Page 32-33

High-School Gymnasium #2 ..... Page 34-35

High-School Gymnasium #3 ..... Page 36-37

Competition Indoor Swimming Pool ..... Page 38-39

Outdoor Swimming Pool #1 ..... Page 40-41

Outdoor Swimming Pool #2 ..... Page 42-43

Outdoor Swimming Pool #3 ..... Page 44-45

Indoor Ice Rink #1 ..... Page 46-47

Indoor Ice Rink #2 ..... Page 48-49

Indoor Ice Rink #3 ..... Page 50-51

Convention Center ..... Page 52-53

Warehouse or Large Retail Store ..... Page 54-55

Large Air-Inflated Structure ..... Page 56-57

City Street / Festival System ..... Page 58-59

NOTICE: Every effort has been made to insure that the information contained in this manual was complete and accurate at the time of printing. However, due to ongoing technical advances, changes or modifications may have occurred that are not covered in this manual.

INTRODUCTION

Community's R-Series is a high-quality, high-fidelity product line designed to be highly weather-resistant. R-Series products perform consistently in continuous outdoor exposure while simultaneously providing superlative acoustic performance.

This Applications Guide discusses a variety of applications for R-Series loudspeakers. For each type of facility, we have provided two or three different example designs with discussions about the merits of each design. Although the specific facilities in this Guide are fictional, the designs shown are representative of typical R-Series applications and should be helpful in designing sound systems for similar facilities.

Community emphasizes that these examples were created as guidelines only. They are not intended to be finished designs and may or may not be suitable for specific projects. For a specific project, Community recommends the services of a qualified acoustical consultant or design/build contractor.

For specific projects, Community's TAG Team (Technical Applications Group) can provide additional product and applications assistance and Community's web site has additional resources including an "All-Weather/All-Purpose" Brochure describing all R-Series and Wet Series II Models.

A DISCUSSION OF WEATHER-RESISTANCE

Weather-resistant is a relative term that describes a loudspeaker's ability to resist the effects of weather in outdoor applications. Typical weather-related damage encountered in loudspeakers affects the enclosure, drivers, hardware, and internal components such as crossovers.

Community's R-Series enclosures are fabricated entirely of hand-laminated fiberglass, or roto-molded gray polyethylene, making them virtually impervious to weather-related effects. Fiberglass versions are coated with an attractive, light gray gel-coat to help keep the loudspeaker cooler in sunlight. High-frequency drivers and their diaphragms are made of highly weather-resistant materials. Midrange and low frequency cones are treated to repel moisture. All external hardware on the loudspeaker is high-grade steel or aluminum with a weather-resistant, powder-coated finish. The grille is backed with a layer of open cell foam supplemented by a fine mesh plastic to block rain or snow. This grille "sandwich" is acoustically transparent but highly resistant to even driving rain. The perforated metal grille also keeps out insects and birds. There are no connectors on an R-Series loudspeaker. Instead, a highly weather-resistant type 12' (3.6 m) 16-2 SJOW cable is permanently attached to the loudspeaker through a weather-tight gland nut. This connection is far superior to any exposed connector.

DESCRIPTION OF THE R-SERIES

All-Weather/All-Purpose

Though designed to handle the harshest outdoor conditions, R-Series is the perfect choice for many indoor environments. With 22 models to choose from, ranging from short throw with wide coverage angles to ultra-narrow, long throw systems, the task of designing an acoustically and economically effective sound system has never been easier. In many cases, a small number of R-Series loudspeakers can provide top quality sound for a surprisingly large physical area, making them one of the most acoustically and economically effective solutions available anywhere.

R-Series Applications

R-Series products are designed for permanent installation or portable use both outdoors and indoors. The primary applications for Community's R-Series are those where re-entrant horns, outdoor two-way horn/woofer loudspeakers, and some larger horn loudspeakers typically are used but lack capability for both high quality music reproduction and longer distance voice projection. By contrast, R-Series products have excellent fidelity and wide frequency range for both music reproduction and voice projection.

R-Series products are ideally suited for athletic fields (football, soccer, baseball, tennis) and field houses, theme parks, amusement parks, swimming pools, ski slopes, cruise ships, steeple carillons, fairgrounds, rodeos, small arenas, racing tracks, air shows, skating rinks, convention centers, factories, warehouses, and portable sound systems. They can complement Community WET Series II products for projects needing a combination of both longer and shorter-throw applications.

INTRODUCTION

R-Series Indoor Applications

R-Series and WET Series II loudspeakers are great indoor loudspeakers. These models are ideal for humidity-prone environments like gymnasiums and swimming areas. Selected models are available in specially-designed indoor versions without the weather-resistant grille. Where likelihood of splashing (indoor water park) or physical abuse (gymnasium) is possible, Community recommends the standard R-Series model with the grille.

R-SERIES FEATURES

R-Series products are entirely constructed of corrosion-resistant materials like fiberglass, powder-coated steel or aluminum, non-metallic and carbon fiber, using sophisticated technologies to ensure they will withstand exposure to harsh environmental conditions.

Weather-Resistant LF Cones and HF Diaphragms

All R-Series models feature weather-resistant LF cones and HF diaphragms.

Ferrofluid™

Most LF, MF & HF drivers use Ferrofluid in their voice coil gaps. Ferrofluid provides improved heat transfer resulting in higher power handling, reduced distortion from fluidic dampening of mechanical resonance, and it seals the air gaps against corrosion and oxidation.

Driver Protection

Functioning as a limiter, Community's exclusive DYNA-TECH™ protection circuitry found in many R-Series models provides precise and repeatable protection by reducing excessive power to the drivers. In other models PowerSense™ DDP (Dynamic Driver Protection) protection circuitry is built into the crossover to provide protection against excessive current.

Fiberglass or Polyethylene Horns and Enclosures

Horns and enclosures on larger R-Series models are constructed of hand-laid fiberglass. Fiberglass is inherently weather-resistant while exhibiting the strength, stiffness, and non-resonant characteristics needed to insure an acoustically inert loudspeaker enclosure. Enclosures and horns for the R.5 and R.25 models are attractively molded from highly weather-resistant polyethylene.

The unique curved shape of R-Series and WET Series II helps reduce standing waves within the enclosure for improved LF performance. Outdoors, the rounded shape inhibits standing water and helps to diffract wind, which in turn reduces the wind load on the supporting structure.

Horn Technology

Community is the originator and master of fiberglass horn manufacturing. The horns used in many WET Series II and R-Series loudspeakers are constructed as one-piece, precision waveguides by hand-crafting on a precision mold using 100% hand-laminated fiberglass. Balsa wood is embedded and laminated into the fiberglass at strategic points to create extremely strong, double wall constructions which damp vibrations providing clean, resonant-free sound. In compact R-Series models, the horns are constructed of high density polyethylene with reinforcing ribs to dampen vibrations. Perforations in the horn reduce reflections from the LF driver while still providing optimum pattern control and acoustic loading for the high frequency driver.

Weather-Stop™ Grille

Each enclosure is fitted with Community's proprietary Weather-Stop protective grille. The grille consists of an external perforated, powder-coated steel panel, followed by a layer of open cell foam, and an inner layer of fine mesh plastic. This grille assembly prevents water intrusion, while providing a high degree of acoustic transparency.

Powder-Coated Steel Hardware

Most hardware and fasteners are made of corrosion-resistant powder-coated steel or stainless steel.

Input Cables

To help maintain its weather-resistance properties, there are no connectors on an R-Series loudspeaker. Instead, input is via an attached 12 ft (3.6 m) 16-2 SJOW-type neoprene jacketed cable (rated for outdoor use) with a weather-tight gland-nut.

Envirotech™ Technology

All internal circuitry is protected from the elements with our proprietary Envirotech coating which seals sensitive electronic components against the effects of moisture and corrosion.

High-Performance Crossovers and Autoformers

R-Series models feature high-power, high-performance two-way and three-way passive crossover networks with over-current protection circuitry. 70V/100V models use a 200W, high-performance autoformer with lower loss than a true transformer (the R.5SUB-T subwoofer uses a high-performance true transformer).

Versatile Mounting Accessories

Weather-resistant, powder-coated steel yoke-style mounting brackets are included with most models, while a variety of optional mounting kits are available for others.

R-SERIES MODELS

The R-Series family features 22 models that range in capability from short throw usage for local area fill (less than about 50 feet or 15m), to extremely long throw capable of reaching across an entire stadium (as much as 700 feet or 215m). A wide selection of coverage angles and power output capabilities characterize this versatile product line. A small, single 12" subwoofer (called the R.5SUB) and a much larger dual 12" subwoofer (called the R2SUBZ) are available to complement full-range systems. A full, horn-loaded subwoofer/bass augmentation loudspeaker is available as model R6-Basshorn. Smaller R-Series products are rotationally molded of polyethylene, while the larger models are made from hand-laid fiberglass. All models are available in architectural light gray, but custom colors are also available (call for price and delivery quote). All medium and long throw R-Series systems feature horn loading in all frequency bands. The R2 is offered in three symmetric horn patterns and two asymmetric horn patterns, and all models except R.5SUB, R6, RMG and RSH are equipped with internal protection circuitry to guard against excessive power. Because of their versatility, performance and weather-resistant properties, R-Series systems are found in many of the world's pre-eminent motor speedways, sports venues, and convention centers.

R-SERIES AND WET SERIES II

WET Series II is a major upgrade to Community's second weather-resistant loudspeaker product line. WET was designed for exceptional musicality and speech intelligibility using premium components housed in attractive molded fiberglass enclosures available in white or black.

Although the two lines overlap in application, Community's R-Series is primarily designed for medium- and long-throw, voice-range applications where WET loudspeakers are primarily designed for short- and medium-throw, musical applications. This provides the designer with many opportunities for systems using both product lines.

Thus, Community recommends R-Series as the main loudspeaker systems for long-throw applications like sports stadiums and we recommend WET Series II for distributed systems in water parks or ski resorts that feature continuous music. We encourage designers to explore the highly effective end results that can readily be obtained by mixing and matching these two product categories to best suit the design requirements.

R-SERIES ACCESSORIES AND OPTIONS

Mounting Yoke and Multi-Angle Aiming Strap

All R.25 and R.5 models include a pre-installed, powder-coated steel mounting yoke. A Multi-Angle Aiming Strap is included with selected R-Series models to help keep the speaker aimed in the intended direction.

Other Rigging Accessories

Always purchase rigging accessories, including eyebolts and other mounting hardware, from a reliable supplier who certifies their products for the intended application. For outdoor use or use in corrosive atmospheres (like indoor swimming pools), make sure the rigging accessories are corrosion resistant. ATM Flyware, a division of Allen Products, is an example of a rigging supplier that supplies certified products for professional audio installations www.atmflyware.com. Another example of a certified rigging products supplier is Polar Focus www.polarfocus.com.

INSTALLATION

70-Volt, 100-Volt Autoformer

Transformer versions ("T" suffix) include an internal 200W, 70/100V autoformer or transformer. For 70V lines the input taps are 200W, 100W, 50W and 25W. For 100V lines the taps are 200W, 100W and 50W.

Some models have a multi-wire input cable to select the tap (R.5Coax, R.5SUB, R.5HP, etc.). In this case, termination is usually best made inside an appropriate electrical box (weatherized as needed) using standard wire splicing methods. Other versions have a screwdriver-selectable switch accessible through a plug screw (R.25-94TZ & R.5xxTZ) which is accessed by removing the plug. Rotate the switch to the appropriate stop ("click") for the desired tap using a flat-head #1 screwdriver. Re-insert the plug screw after adjusting the tap to maintain weather-resistance. Use caution not to over tighten the plastic plug screw to avoid stripping the delicate plastic threads. For the R.25-94TZ, re-install the plug so that is flush with the exterior of the cabinet to avoid undue pressure on the switch mechanism. For additional information, Community's web site includes specification sheets and a technical note on the design of 70-volt/100-volt distributed systems.

Custom Colors

All R-Series and WET Series II product may be ordered in custom colors to elegantly match their physical installation environment. Please contact Community for a quote on cost and lead time.

Using Yoke Brackets

Community provides one yoke-type mounting bracket with every R-Series loudspeaker except the R6-51 and R6-Basshorn. In most cases, this will be the preferred hardware for mounting these products. The yoke attaches to the sides of the cabinet with the provided fasteners. It also includes an array of holes along the center strap of the yoke to fasten to structural points deemed suitable by the installer and/or professional engineer.

Using Safeties

For some applications, the installing contractor or professional engineer might deem necessary (or advisable) that R-Series cabinets be installed with a secondary means of attachment such as a safety cable. In fact, some local building codes and other regulations may require safety cables, chains or other secondary supports due to seismic concerns, excessive wind loads, etc. Be aware that safety attachment points should not be located at insert points on opposite sides of the cabinet in such a manner that they present a significant force that pulls the insert points away from each other. All safety cables, chains, or other restraining hardware shall be installed so that the line is taut and positioned to minimize dynamic loading (falling, bouncing, swinging, etc.) in the event that the loudspeaker's primary mount fails.

Community does offer in its catalog forged, rated eyebolts intended for rigging loudspeakers. However, these eyebolts are not rated for outdoor use and the shank is too long for the threaded inserts on R.25 and R.5 loudspeakers. This length limitation does not apply to the R1 and R2 loudspeakers. Using an eyebolt with too long of a shank will not permit the eyebolt shoulder to properly seat against the exterior of the cabinet. Installers will need to procure appropriate hardware made from the appropriate material and shank length to meet the needs of each application.

In some cases, forged, overhead rated shoulder eyebolts may be used as attachment points on the cabinet for safety cables with some restrictions. The eyebolt must be screwed in and firmly seated (do not over tighten) with the shoulder of the eyebolt making contact with the rubber washer on the exterior of the cabinet. A rubber washer shall be used between the eyebolt and the cabinet to maintain weather resistance. Shims may be used between the eyebolt and the rubber washer to position the eye so that it is in the same plane as the suspension cable or chain. Care must be taken to ensure that the safety cable will not induce a load off-axis from the eyebolt's threaded shank.

Hoist Rings provide a method of attachment which has advantages over eyebolts that permit more flexibility in regard to the pull/load direction of the safety line, though at a higher cost. Hoist rings include a hinged "eye" which allows the load applied to the cabinet threaded inserts to remain largely in shear, thus preserving the integrity of the insert point. The same precautions should be taken to properly seat the hoist ring as when seating an eye bolt.

As with all aspects of mounting and rigging loudspeakers, the use of eyebolts, hoist rings, and other safety cabling hardware should be included in a rigging plan approved by a professional engineer.

⚠ ***IMPORTANT*:** The mounting bolts that come installed in each R-Series enclosure must either be used to mount the Accessory Mounting Yoke or they must remain in place. If the rigging fittings are not sealed, air leaks will occur in the enclosure that will compromise the loudspeaker's weather-resistance and its low frequency performance.

⚠ ***IMPORTANT***: Eyebolts and other mounting hardware for outdoor usage with R-Series loudspeakers must be corrosion resistant steel properly rated for the load weight.

Custom Mounting Brackets

Custom brackets, made of corrosion-resistant, properly-rated steel may be used. When mounting the loudspeaker the bracket should pull directly either in tension or shear on the mounting bolt. It is recommended that any custom bracket utilize two mounting points on the opposite sides or top and bottom of the enclosure.

Mounting an R6-51 or R6-Basshorn

Mounting systems for large loudspeakers, like the R6-51 and R6-Basshorn, vary widely depending on the needs of the facility. For this reason, Community does not supply a yoke, fasteners or any other mounting hardware with the R6-51 or R6-Basshorn. The installing contractor must supply all such hardware and must design a secure mounting system for the loudspeaker. Always use properly-rated, corrosion-resistant fasteners of an appropriate length, secured with washers, lock washers and Locktite or other fastener-locking method. The overall mounting system must be approved by a licensed P.E. (USA) or other certification professional (outside USA) before installation.

The R6-51 and R6-Basshorn have four primary mounting points, with ½" x 13-TPI stainless steel inserts, suitable for suspension of the loudspeaker. Two are located on the back of the loudspeaker. One is on the top and one is on the bottom. The R6-51 and R6-Basshorn also have 10 holes in the front enclosure flange which are not designed for primary suspension usage or for safety-cable attachment. However, these front mounting holes may be used as supplemental mounting points for support of the front of the loudspeaker. Note that, on the R6-51, there are three bolts on the top and the bottom of the enclosure used to fasten the mid-high pack to the inside of the loudspeaker. These bolts are not suitable for suspension or for safety-cable attachment.

For many applications, the top and bottom mounting points, used together, are sufficient for secure mounting of these loudspeakers. When a safety-cable mounting point is required, one or both of the rear mounting points may be used. In applications where the loudspeaker may be subjected to high wind loads or other unusual stresses, Community recommends the loudspeaker be mounted from the top and bottom and at least one of the rear mounting points with the remaining rear mounting point available for a safety cable. For additional support in these applications, design the mounting structure to utilize the front mounting points as supplemental support. When possible, use all three mounting systems (top/bottom, rear, front). When in doubt, consult with the same licensed P.E. or other certification professional who will approve the design.

Orienting an R-Series Loudspeaker

An R-Series loudspeaker has a definite top, bottom and sides. However, a 180 degree inversion will not affect the coverage. When the top of the enclosure is up, the input cable gland-nut will be down and to your right when looking directly at the front of the loudspeaker. Also, the manufacturer's label is on the top of the enclosure. Once the top is determined, you can properly orient the loudspeaker for your particular application according to the specified coverage pattern. When installed outdoors, Community recommends tilting an R-Series loudspeaker downwards at least 15° to allow water to drain from the enclosure.

R-Series Throw Distance and Sound Levels

The chart on Page 11 helps answer the question, "how far can it throw?". The chart shows the maximum distance at which a given model can reach 96 dB SPL on the A Scale (speech range). Consider a high-school football stadium where the crowd noise is 86 dBA. At the recommended distance, an R.25 or R.5 would provide 10 dB headroom above the crowd noise. Even if the crowd noise reaches 90 dBA, the R.25 or R.5 would still provide 6 dB of headroom which is acceptable for voice paging and announcement systems (use a limiter to avoid clipping).

In larger facilities, crowd noise can exceed 100 dBA. At motor racing events, racing noise can exceed 120 dBA near the track. It is impractical and unsafe to try to page above these levels. It's better to train announcers to wait till the crowd (or motor noise) quiets down and to repeat the page.

Additional Notes on Weather-Resistance

- No loudspeaker is completely "weather proof". However, Community R-Series loudspeakers are designed to withstand continuous outdoor exposure for many years of operation.
- We recommend **angling the R-Series loudspeaker at least 15 degrees downward** so as to reduce the possibility of rain and other precipitation compromising the performance of the loudspeaker.
- All mounting holes must be sealed off with the supplied bolts, washers, and rubber washers. If, for any reason, these bolts must be removed, seal off the hole with silicone caulking or some other suitable weather-tight sealant. The rubber washers supplied with the mounting bolts must always seat against the enclosure.
- The gland nut securing the loudspeaker cable to the enclosure is sealed at the factory. Do not attempt to remove this nut or the weather-tight seal will be broken. If it is desired to replace the gland nut with a connector, the connector must be a

weather-proof design, sealed to the enclosure with silicone caulk or some other suitable weather-tight sealant. Neutrik models NLT4MP and NLT4FX are good choices for this purpose. When mounting, we recommend installing R-Series with the gland nut at the bottom wherever possible. Always leave a "drip loop" so water will not migrate toward the loudspeaker.

- The grille assembly is designed to prevent normal and wind-driven rain from directly entering the mouth of the loudspeaker. The grille is not designed to withstand such things as being directly sprayed from a hose.
- If you use any hardware in place of the supplied steel screws, bolts, nuts, and washers supplied, it should also be made of corrosion-resistant, properly-rated steel.
- Always use outdoor-rated cable. Always seal connections in a weather-tight electrical box. Community recommends periodic inspections of installed rigging hardware to discover and repair any unexpected corrosion or damage.

IMPORTANT: If the above instructions are not observed, the weather-resistant integrity of an R-Series loudspeaker can be compromised. This can result in damage to or failure of the hardware or internal components.

NOTICE - STAINLESS STEEL GRILLE AND YOKE CORROSION: R-Series stainless steel yokes and grilles may show surface corrosion when exposed to marine or other corrosive atmospheres. This corrosion is primarily a cosmetic problem and does not present an immediate hazard. As an option, Community offers higher grade 316 alloy stainless steel grilles and yokes for R-Series and WET Series II products. Contact the factory for pricing and delivery information.

ARTIFICIAL ECHOES

Echoes, Normal and Artificial

Outdoors, it's common for sound to reflect off a wall or building. If a listener hears this reflection at least 35 to 70 milliseconds (depending on level) after the original sound they will perceive it as an echo.

It's possible to create an "artificial echo" by separating two loudspeakers far enough apart that a listener hears the second loudspeaker at least 35 to 70 milliseconds after they hear the first loudspeaker. There's no reflection here but the effect is the same - an unwanted echo.

To avoid normal echoes, try to aim loudspeakers away from walls or buildings. To avoid artificial echoes, use a point source or distributed design as illustrated in this Applications Guide. When it's necessary to split the loudspeakers, try to avoid overlapping coverage. That is, to the extent possible, each listener should hear only one loudspeaker.

The Announcer's Echo

Imagine an outdoor system at a sports facility where the announcer is located 35 to 70 feet (11m-21m) or more from the loudspeakers. The announcer will hear his or her own voice. Then, about 35 to 70 milliseconds later, the announcer will hear their own voice again as an echo! Although a broadcast professional or other trained announcer may be able to ignore this echo, most people find it difficult to speak in this situation. To minimize the problem, close the window in the announcer's booth. Alternatively, give the announcer a local monitor loudspeaker or a set of headphones so he can hear his own voice strongly. This masks the echo and minimizes the distraction.

This same problem occurs for an announcer on the field in a sports facility. Use a monitor loudspeaker or headphones, as described above, to minimize this problem.

FOR MORE INFORMATION

For more information on installing and operating your R-Series loudspeakers, please refer to Community's web site at: www.communitypro.com

For applications support, service or warranty information, refer to Community's web site or contact Community at 610-876-3400 / 1-800-523-4934.

COMMUNITY'S TECHNICAL APPLICATION GROUP (TAG)

Contact Community's "TAG Team" (Technical Applications Group) for applications support on systems that use R-Series and other Community loudspeakers. Our TAG Team can help choose the right product for each system and assist in system design, loudspeaker layout, acoustic simulation analysis and provide information needed for system commissioning.

Contact the TAG Team at 610-876-3400 / 1-800-523-4934 or email TAGTEAM@communitypro.com.

SYSTEM OPTIMIZATION

CHOOSING THE RIGHT LOUDSPEAKERS AND ELECTRONICS

Choose R-Series models with high enough maximum SPL to provide the needed SPL at the farthest listener with an appropriate headroom. Typical headroom factors are at least 6 dB for voice paging, at least 10 dB for voice reinforcement and at least 20 dB for music reinforcement.

Choose R-Series models with the right frequency response for the application. Subwoofers will improve the sound quality of a music reinforcement system but may reduce intelligibility in a voice-only system in a reverberant space.

Choose R-Series models with the right coverage patterns to cover the audience evenly. Point the loudspeakers at the listeners and away from walls and ceilings or outdoor obstructions.

In outdoor applications, loudspeakers may be far enough apart to create artificial echos in areas of overlapped coverage. Ideally, put all loudspeakers in a central location (central cluster design) or use a distributed system design to minimize this problem. In any case, minimize overlap when loudspeakers are separated by more than approximately 40 feet.

Choose power amplifiers large enough to provide the desired power output with enough headroom to avoid clipping. Use a limiter and high-pass filter to protect the loudspeakers. Follow proper wiring design and adjust gains and levels to minimize hum and noise.

COMMISSIONING THE SYSTEM

Commissioning is the process of optimizing the performance of the system after it has been installed. There are several steps in commissioning including verifying the proper operation of each system component and adjusting system gains and levels.

The last step in system commissioning is known as system equalization or "voicing." Equalization is the process of adjusting the frequency response of the system to optimize voice intelligibility or musical sound quality (or both). Note that R-Series loudspeakers are factory voiced to optimize their speech intelligibility and musical sound quality. For this reason, many designers find they can minimize overall system equalization and still achieve excellent voice intelligibility and musical sound quality.

When equalizing an R-Series loudspeaker system the following points should be kept in mind to achieve the best results and to avoid damaging the drivers.

1. Use only small amounts of equalization. In particular do not boost frequencies by more than about 3 dB. When cutting frequencies more than 3 dB of attenuation is OK. Bear in mind that extreme frequency cuts will usually result in less than optimum performance.

2. Do not attempt to boost any frequencies below 100 Hz with a graphic equalizer. Note that with the recommended high-pass filter, moderate amounts of boost from a simple bass control are acceptable.

THROW DISTANCE CHART

Recommended Effective Operating Distances*

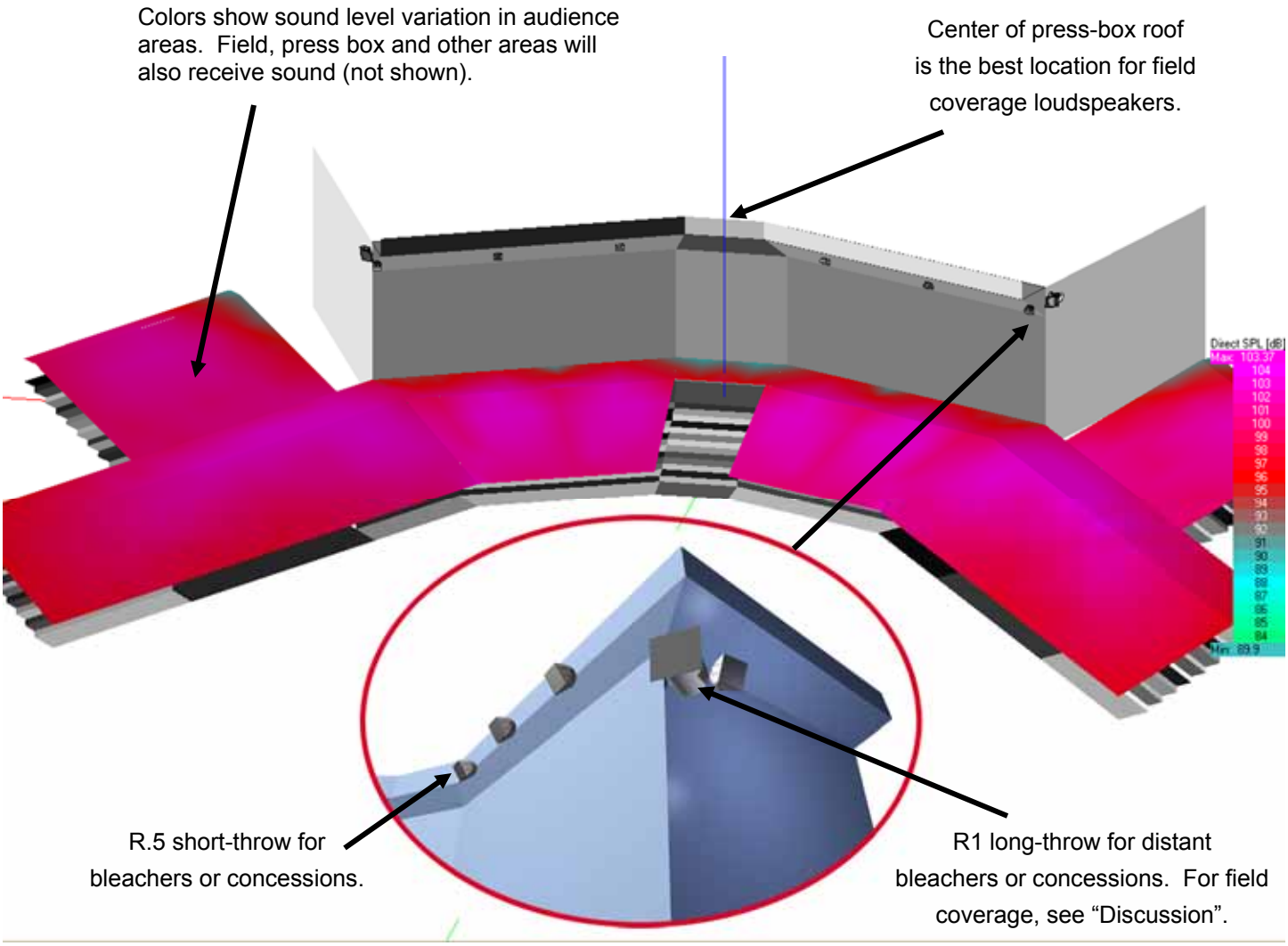
	Model	Pattern (H x V)	Description	Distance
R.25	R.25-94Z	90° x 40°	2-way coaxial system	20 yds / 18m
	R.25-94TZ	90° x 40°	2-way coaxial system - 200W autoformer	20 yds / 18m
R.5 Full-Range	R.5-66Z	60° x 60°	2-way system	30 yds / 27m
	R.5-66TZ	60° x 60°	2-way system - 200W autoformer	30 yds / 27m
	R.5-94Z	90° x 40°	2-way system	30 yds / 27m
	R.5-94TZ	90° x 40°	2-way system - 200W autoformer	30 yds / 27m
	R.5-99Z	90° x 90°	2-way system	30 yds / 27m
	R.5-99TZ	90° x 90°	2-way system - 200W autoformer	30 yds / 27m
R.5COAX	R.5COAX66	60° x 60°	2-way coaxial system	20 yds / 18m
	R.5COAX66T	60° x 60°	2-way coaxial system - 200W autoformer	20 yds / 18m
	R.5COAX99	90° x 90°	2-way coaxial system	20 yds / 18m
	R.5COAX99T	90° x 90°	2-way coaxial system - 200W autoformer	20 yds / 18m
R.5HP	R.5HP	60° x 40°	3-way system	60 yds / 55m
	R.5HPT	60° x 40°	3-way system - 200W autoformer	50 yds / 46m
R.5SUB	R.5SUB	360° x 180°	Compact subwoofer	10 yds / 9m
	R.5SUB-T	360° x 180°	Compact subwoofer - 200W transformer	10 yds / 9m
R1	R1-64Z	50° x 35°	2-way system	50 yds / 46m
	R1-66Z	60° x 60°	2-way system	50 yds / 46m
	R1-94Z	80° x 35°	2-way system	50 yds / 46m
R2	R2-52Z	50° x 20°	3-way long throw	100 yds / 91m
	R2-474Z	40°-70° x 40°	3-way asymmetrical medium throw	80 yds / 73m
	R2-694Z	60°-90° x 40°	3-way asymmerical short throw	60 yds / 55m
	R2-77Z	60° x 60°	3-way short throw	60 yds / 55m
	R2-94Z	80° x 40°	3-way medium throw	70 yds / 64m
	R2SUBZ	360° x 180°	Subwoofer system	10 yds / 9m
	R2SUBDF	360° x 180°	Subwoofer system	20 yds / 18m
R6	R6-51BIAMP	50° x 10°	3-way full-range system	190 yds / 173m
	R6-Basshorn	360° x 180°	Basshorn system	150 yds / 137m
Voice Range	RMG200A	50° x 40°	Voice range horn system	80 yds / 73m
	RMG200AT	50° x 40°	Voice range horn system - 200W autoformer	80 yds / 73m
	RSH-462	60° x 20°	FocusedArray™ horn system	210 yds / 192m

Yards	10	20	30	40	50	60	70	80	90	100	110	120	130	140	150	160	170	180	190	200	210	220	230	240
Meters	9.1	18.2	27.3	36.4	45.5	54.6	63.7	72.8	81.9	91	100.1	109.2	118.3	127.4	136.5	145.6	154.7	163.8	172.9	182	191.1	200.2	209.3	218.4

* *96 dBA SPL with no atmospheric effects; rounded to nearest 10 yards.*

BASEBALL FIELD #1

SEMI-DISTRIBUTED SYSTEM ON PRESS BOX


Colors show sound level variation in audience areas. Field, press box and other areas will also receive sound (not shown).
Center of press-box roof is the best location for field coverage loudspeakers.
R.5 short-throw for bleachers or concessions.
R1 long-throw for distant bleachers or concessions. For field coverage, see “Discussion”.

DISCUSSION

When it’s possible to use a distributed system outdoors, the benefits are numerous. This design offers smooth and even coverage of the seating areas with excellent sound quality and minimal neighborhood spill. The equipment cost is moderate and installation is relatively easy. If the electronics rack can be located in the press box, cable lengths are probably short enough to allow use of regular (vs. transformer) R-Series models which reduces total system costs.

The design is very flexible making it easy to add coverage for remote bleachers, concessions, player dugouts or the field itself. Install the loudspeakers on a press box or centrally-located concessions stand. Alternatively, use the edge of a roof over the bleachers. Consider protecting the loudspeakers from thieves and vandals if they are hanging low enough to reach easily.

Field Coverage and Neighborhood Spill

R1s, located at the ends of the press box, can cover remote seating areas, a concession stand or player dugouts. The press box distributed loudspeakers will provide some field coverage. When additional field coverage is needed, choose a single loudspeaker location such as the center of the press box roof. If there’s a roof over the bleachers, install field cov-

erage loudspeakers at the front (center) edge of the roof. Delay them, if necessary, to match the sound from loudspeakers on the press box.

If there's a light pole behind the press box, this is another potential location for field coverage loudspeakers. Install them high enough to cover the field without overpowering listeners in the bleachers. Delay other loudspeakers as needed to avoid an artificial echo.

A central location for field coverage loudspeakers will avoid the artificial echo problems created by a two-source design. If it's necessary to cover the field from two, widely separated loudspeaker locations, try to minimize the overlap in coverage. That is, aim the loudspeakers so their coverage patterns meet in the center of the field and use minimal overlap.

Feedback, Artificial Echoes and the Announcer Echo

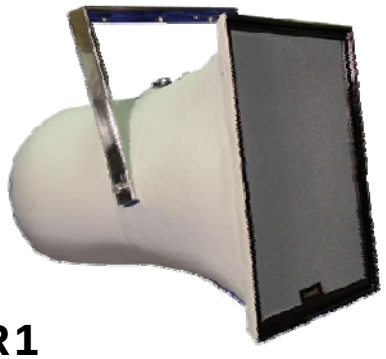
A distributed system like this will not cause artificial echoes unless field coverage loudspeakers are remotely located or split (see above). However, feedback is possible because the loudspeakers may be near the press box announce booth. Provide a head-worn mic or just shut the window to minimize this problem. If the system includes field coverage, an announcer on the field will hear an "announcer's echo". See Page 9 for ways to minimize this problem.

Alternate Loudspeaker Choices and 70/100 Volt Systems

Add R.5SUB or R2SUBZ loudspeakers for extended low frequency response. If the electronics rack is remotely located, most Community R-Series and WET Series loudspeakers are available in 70/100-volt versions. Higher-powered versions, like the R1 or R2, can utilize optional, external 70/100-volt transformers. This makes it possible to use smaller loudspeaker wire which helps reduce the overall system cost.

As a lower-cost design, substitute Community's R.25-94Z (or TZ) for the R.5 models and our R.5-66Z for the R1-66Z. This design will cover the audience well but at a lower level than the original design.

R-SERIES LOUDSPEAKERS USED IN THIS DESIGN



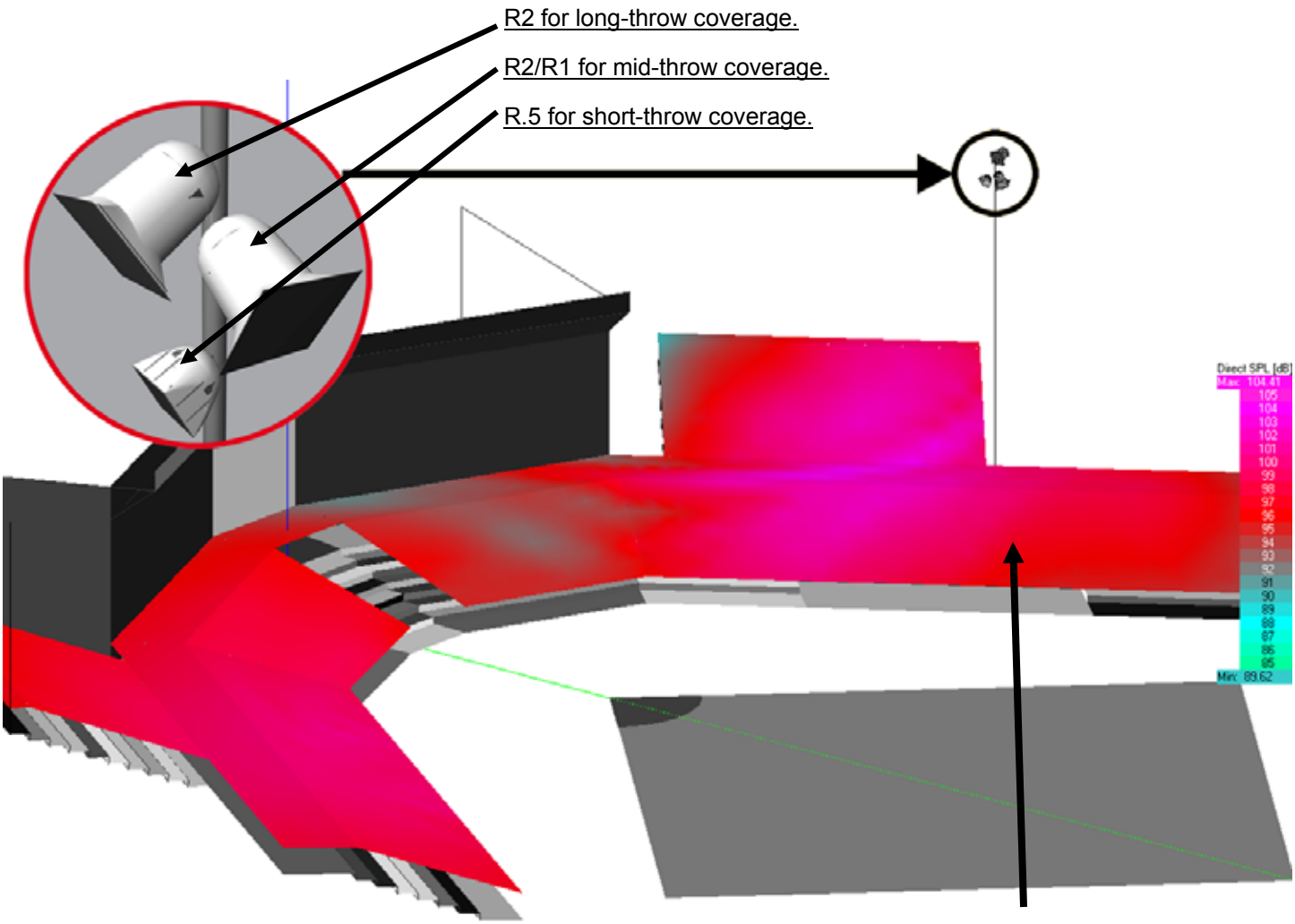
R1

R.5

Qty	Model	Comments
2	R.5-66Z	Used at each end of press box for left and right bleachers coverage
6	R.5-94Z	Distributed along the overhang of the press box for bleachers coverage
2	R1-66Z	Used at each end of press box for distant bleachers or concessions coverage
System Cost Estimate - $$		Based on cost comparison scale: $ = lower cost, $$$$$ = higher cost

BASEBALL FIELD #2

POINT-SOURCE SYSTEM ON SINGLE LIGHT POLE



Colors show sound level variation in audience areas. Field, press box and other areas will also receive sound (not shown).

DISCUSSION

When you can cover an entire facility from one location, a point-source system is almost always the most economical choice. In this example, we've covered the entire bleachers area from a single light pole using only three R-Series loudspeakers. The equipment cost is significantly lower than the previous distributed system and the design is easy to expand for coverage of remote concessions, dugouts or the field itself. The lower equipment cost in this design will be somewhat offset by an increased cost for installation and wiring. Also, this design doesn't cover the seating area quite as evenly as the distributed system and there will be more neighborhood spill. Often, these minor tradeoffs are easy to accept given the reduction in cost.

Field Coverage and Neighborhood Spill

For field coverage, add an additional R2. R2s are available in a variety of coverage patterns for this purpose. To minimize neighborhood spill, choose the loudspeaker location so the loudspeakers point away from the neighborhood. Also, mount the loudspeakers high in the air and point them downward.

Feedback, Artificial Echoes and the Announcer's Echo

Feedback is unlikely in this system because the loudspeakers are a long distance from the microphone. There's no chance of artificial echoes in this design since all the loudspeakers are in one location. Real echoes are possible, of course, so try to aim the loudspeakers away from any nearby walls or buildings. It's also possible that an announcer in the press box will hear an echo of his or her voice. The same problem can occur for an announcer on the field. See Page 9 for ways to minimize these problems.

Alternate Loudspeaker Choices and 70/100 Volt Systems

Add R2SUBZ loudspeakers for extended low frequency response. Most Community R-Series and WET Series loudspeakers are available in 70/100-volt versions. Higher-powered versions, like the R1 or R2, can utilize optional (external) 70/100-volt transformers. This makes it possible to use smaller gauge wire to the loudspeaker location which helps reduce the overall system cost.

As a lower-cost, alternative design substitute Community's R1-94Z for the R2-94Z, the R1-64Z for the R2-52Z and an R.5-66Z for the R.5HP. This alternative design will cover the facility well but will not reach "rock 'n' roll" levels.

R-SERIES LOUDSPEAKERS USED IN THIS DESIGN

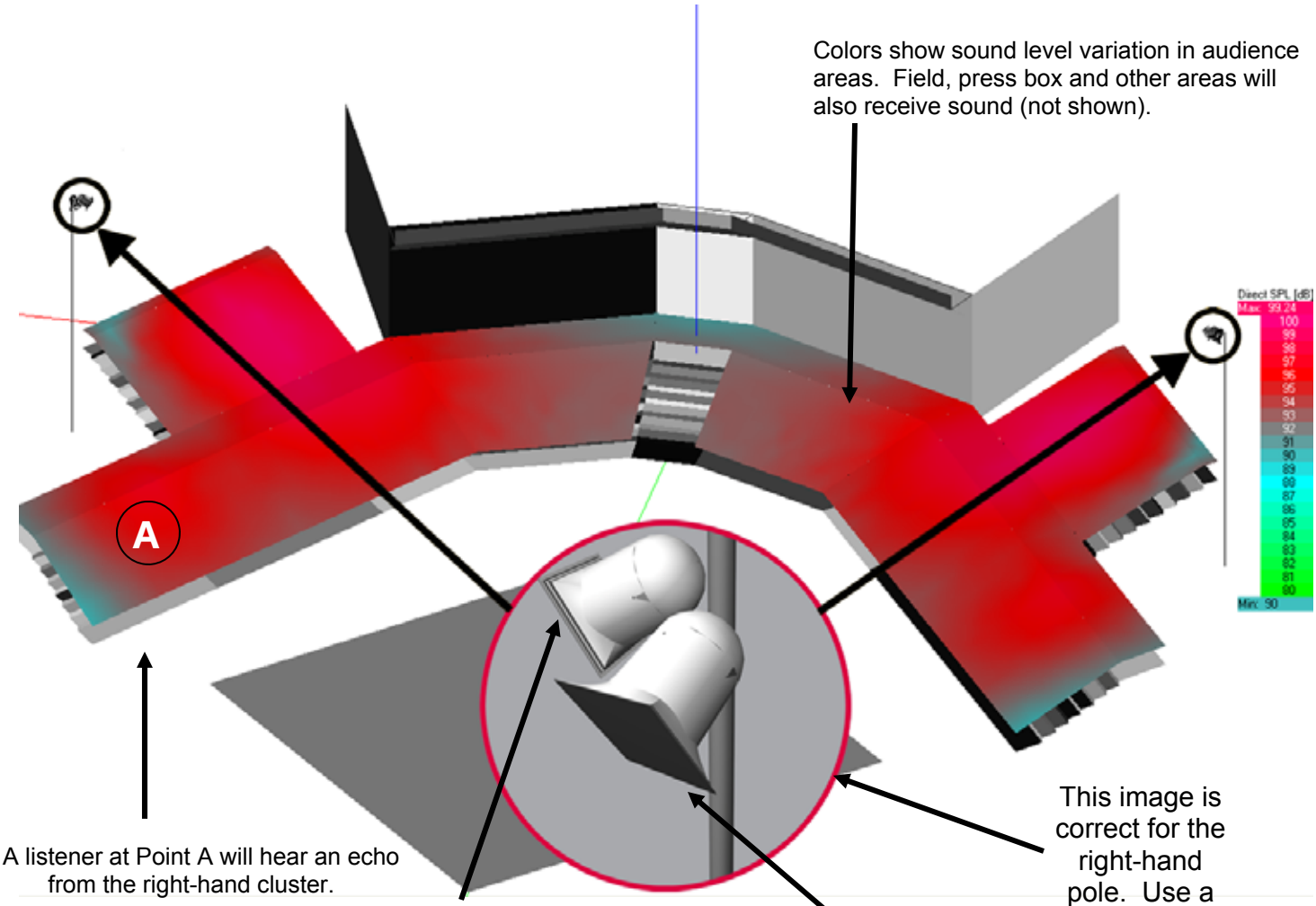
R2

R.5HP

Qty	Model	Comments
1	R2-94Z	For coverage of the bleachers to the right of the pole
1	R2-52Z	For coverage of the center bleachers and bleachers farthest from the pole
1	R.5HP	For coverage of the bleachers nearest the pole
System Cost Estimate—$$		Based on cost comparison scale: $ = lower cost, $$$$$ = higher cost

BASEBALL FIELD #3

SPLIT POINT-SOURCE SYSTEM ON TWO LIGHT POLES


Colors show sound level variation in audience areas. Field, press box and other areas will also receive sound (not shown).
A
A listener at Point A will hear an echo from the right-hand cluster.
R2 for long-throw coverage.
R1 for mid-throw coverage.
This image is correct for the right-hand pole. Use a mirror-image cluster for the left-hand pole.

DISCUSSION

Community does not recommend a split cluster system of this design because it is very difficult to avoid artificial echoes. Sometimes, however, it's just not possible to cover an entire ball park from a single loudspeaker location and there aren't enough loudspeaker locations to allow a proper distributed system design.

In this case, a split-cluster design may be the only solution. The problem with this design is the artificial echoes that will be created in most locations. Any listener that is 35 to 70 feet (11m-21m) farther from one cluster than the other will hear an echo. For example, consider a listener at Point A. Typically, this listener might be 50 feet (15m) from the left cluster and 200 feet (60m) from the right cluster. Since sound travels 1100 feet per second (335m/sec), the listener at Point A hears the sound from the right cluster 136 msec after he hears the sound from the left cluster. This long delay will produce a distinct echo, even if the sound from the right cluster is as much as 10 dB lower in level than the sound from the left cluster.

Not all listeners will hear this kind of echo. For example, listeners near the center of the bleachers or the center of the field will be equidistant from both clusters. These listeners will not hear an echo.

Field Coverage and Neighborhood Spill

This system will have some field coverage from the R2 loudspeakers aimed at the bleachers. For additional field coverage, add an additional R2 at each pole. R2s are available in a variety of coverage patterns for this purpose.

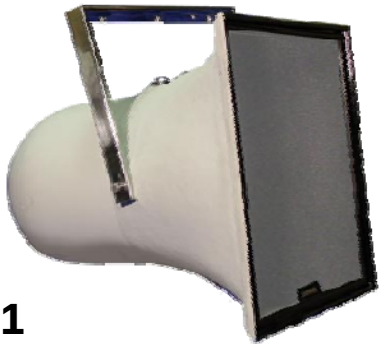
Feedback, Artificial Echoes and the Announcer's Echo

Listeners that hear only one cluster will not hear an echo. Thus, to minimize the problem of artificial echoes in this type of system, aim the loudspeakers to cover one-half of the listening area with a very small overlap area. Community R-Series loudspeakers have well-controlled coverage patterns to help achieve this goal. The "announcer echo" problem will also be present in this system. Follow the recommendations on Page 9 to minimize this problem for announce-booth and field announcers.

Alternate Loudspeaker Choices and 70/100 Volt Systems

Add R2SUBZ loudspeakers for extended low frequency response. Most Community R-Series and WET Series loudspeakers are available in 70/100-volt versions. Higher-powered versions, like the R1 or R2, can utilize optional (external) 70/100-volt transformers. This makes it possible to use smaller gauge wire to the loudspeaker location which helps reduce the overall system cost.

R-SERIES LOUDSPEAKERS USED IN THIS DESIGN



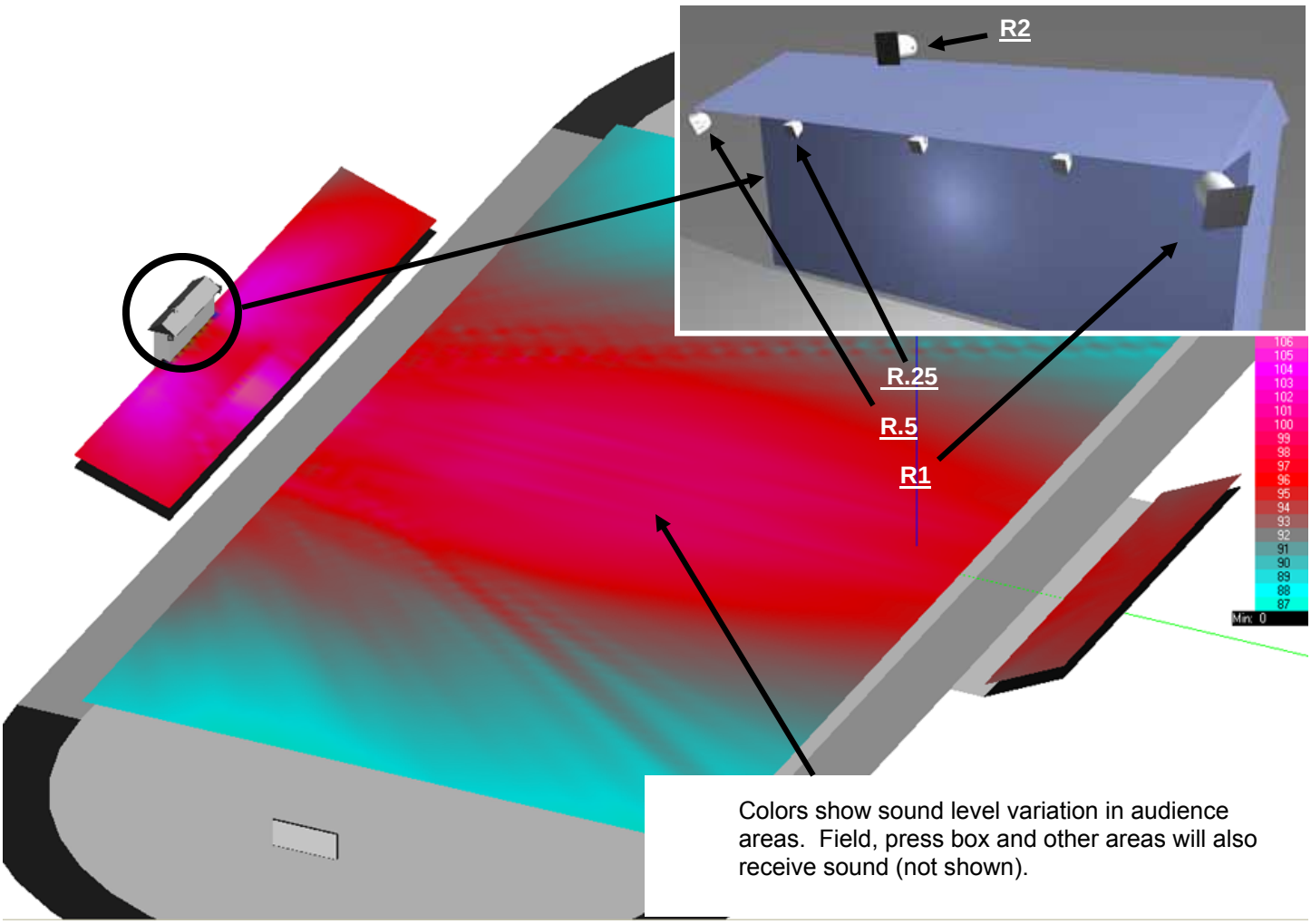
R1

R2

Qty	Model	Comments
2	R1-94Z	For coverage of the bleachers nearest the pole
2	R2-694Z	For coverage of the field and bleachers farthest from the pole
System Cost Estimate - $$		Based on cost comparison scale: $ = lower cost, $$$$$ = higher cost

SMALL FOOTBALL FIELD #1

DISTRIBUTED PLUS POINT-SOURCE SYSTEM ON PRESS BOX



Colors show sound level variation in audience areas. Field, press box and other areas will also receive sound (not shown).

DISCUSSION

This is an excellent design for a small football stadium. It combines the best features of a distributed system (for the home-team bleachers) and a point-source system (for the away-team bleachers). All of the loudspeakers are in one general location which reduces installation costs and eliminates most artificial echoes. If the electronics rack can be located in the press box, cable lengths are probably short enough to allow use of regular (vs. transformer) R-Series models which reduces overall system costs.

If the roof of the press box is less than about 20 feet (6m) above the heads of the nearest listeners, the R2-52Z used for the away-team bleachers may be too loud in the home-team bleachers. Look for an alternate location for the R2-52Z when this occurs. Sometimes, there's a light pole behind the press box. This makes a good alternate location for the R2-52. Mount the R2-52Z at least 20 feet (6m) above the heads of the nearest listeners (30 feet or 9m is better) and delay the remaining loudspeakers, if necessary, to avoid artificial echoes.

Field Coverage and Neighborhood Spill

This system will have some field coverage from the loudspeakers aimed at both sets of bleachers. For additional field coverage, add two R2s, one on each side of the central R2 and aimed at the two ends of the field. R2 loudspeakers are available in several coverage patterns for this usage.

There will be some neighborhood spill behind the away-team bleachers. To minimize this problem, put the R2-52Z as high as possible and aim it down at the away-team bleachers. Delay the other loudspeakers to avoid an artificial echo.

Feedback, Artificial Echoes and the Announcer's Echo

This type of system will not produce artificial echoes. Real echoes are still possible, of course, so try to aim the loudspeakers away from any nearby walls or buildings.

An announcer in the press box will be near the loudspeakers and should not hear an artificial echo. If feedback is a problem, provide a head-worn mic or just shut the window.

An announcer on the field will hear a confusing "announcer's echo". See Page 9 for ways to minimize this problem.

Alternate Loudspeaker Choices and 70/100 Volt Systems

Add R2SUBZ loudspeakers for extended low frequency response. Most Community R-Series and WET Series loudspeakers are available in 70/100-volt versions. Higher-powered versions, like the R1 or R2, can utilize optional (external) 70/100-volt transformers.

R-SERIES LOUDSPEAKERS USED IN THIS DESIGN

R1

R.25

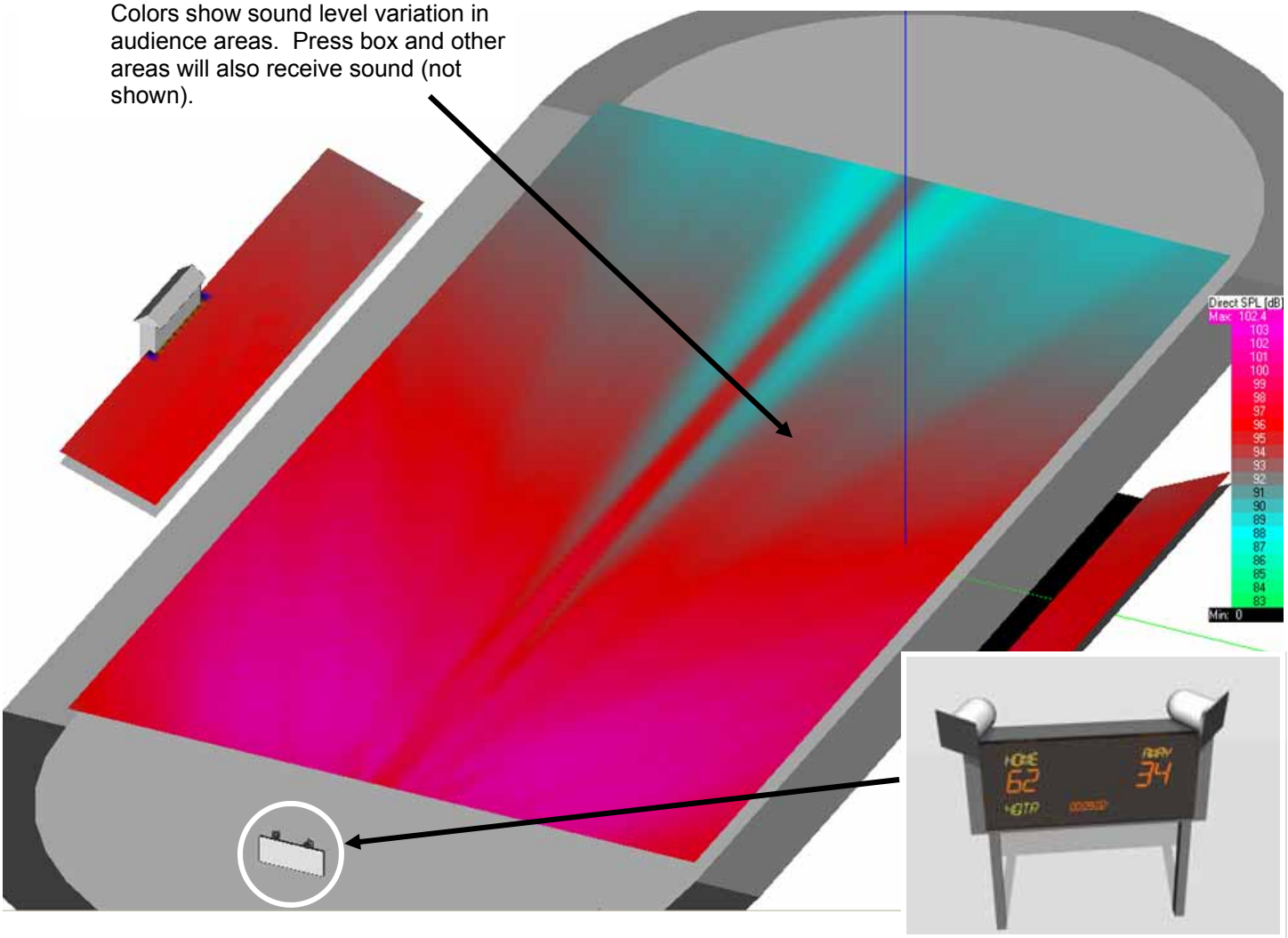
R.5

R2

Qty	Model	Comments
1	R2-52Z	For coverage of the away-team bleachers
1	R.5-94Z	For coverage of the home-team bleachers right
1	R1-64Z	For coverage of the home-team bleachers left
3	R.25-94Z	For coverage of the home-team bleachers center areas
System Cost Estimate - $$		Based on cost comparison scale: $ = lower cost, $$$$$ = higher cost

SMALL FOOTBALL FIELD #2

POINT-SOURCE SCOREBOARD SYSTEM



DISCUSSION

When you can cover an entire facility from one location, a point-source system is almost always the most economical choice. In this example, we've covered both sets of bleachers from the scoreboard using only two R-Series loudspeakers. The equipment cost is significantly lower than the previous distributed system and the design is easy to expand for coverage of remote concessions or the field itself. The lower equipment cost in this design will be somewhat offset by an increased cost for installation and wiring.

Feedback, Artificial Echoes and the Announcer's Echo

There's little chance of feedback in this design because the loudspeakers are a long distance from the announcer's microphone. Also, there's no chance of artificial echoes in this design since all the loudspeakers are in one location. Real echoes are possible, of course, so try to aim the loudspeakers away from any nearby walls or buildings. It's also possible that an announcer in the press box will hear an echo of his or her voice. And, it's likely that an announcer on the field will hear a confusing echo. See Page 9 for a discussion of these problems.

Field Coverage and Neighborhood Spill

This design provides some field coverage. To improve field coverage, add an additional R2. R2s are available in a variety of coverage patterns for this purpose. Also, due to the location, aiming angle and power level of the loudspeakers,

neighborhood spill may be greater. Mount the loudspeakers as high as possible and aim them down at the bleachers and field to minimize this problem.

Alternate Loudspeaker Choices and 70/100 Volt Systems

Upgrade this system to an R6-51 for high-power music requirements. Add an R6-Basshorn for extended low frequency response. Most Community R-Series and WET Series loudspeakers are available in 70/100-volt versions. Higher-powered versions, like the R1 or R2, can utilize optional (external) 70/100-volt transformers. This makes it possible to use smaller gauge wire to the loudspeaker location which helps reduce the overall system cost.

For high-powered loudspeakers like this, however, it's best to locate the amplifier rack near the loudspeakers. This keeps cabling short, eliminates the need for high-power 70/100-volt transformers and improves the overall system performance. Of course, the amplifier rack must be protected from the weather and from temperature extremes.

R-SERIES LOUDSPEAKERS USED IN THIS DESIGN

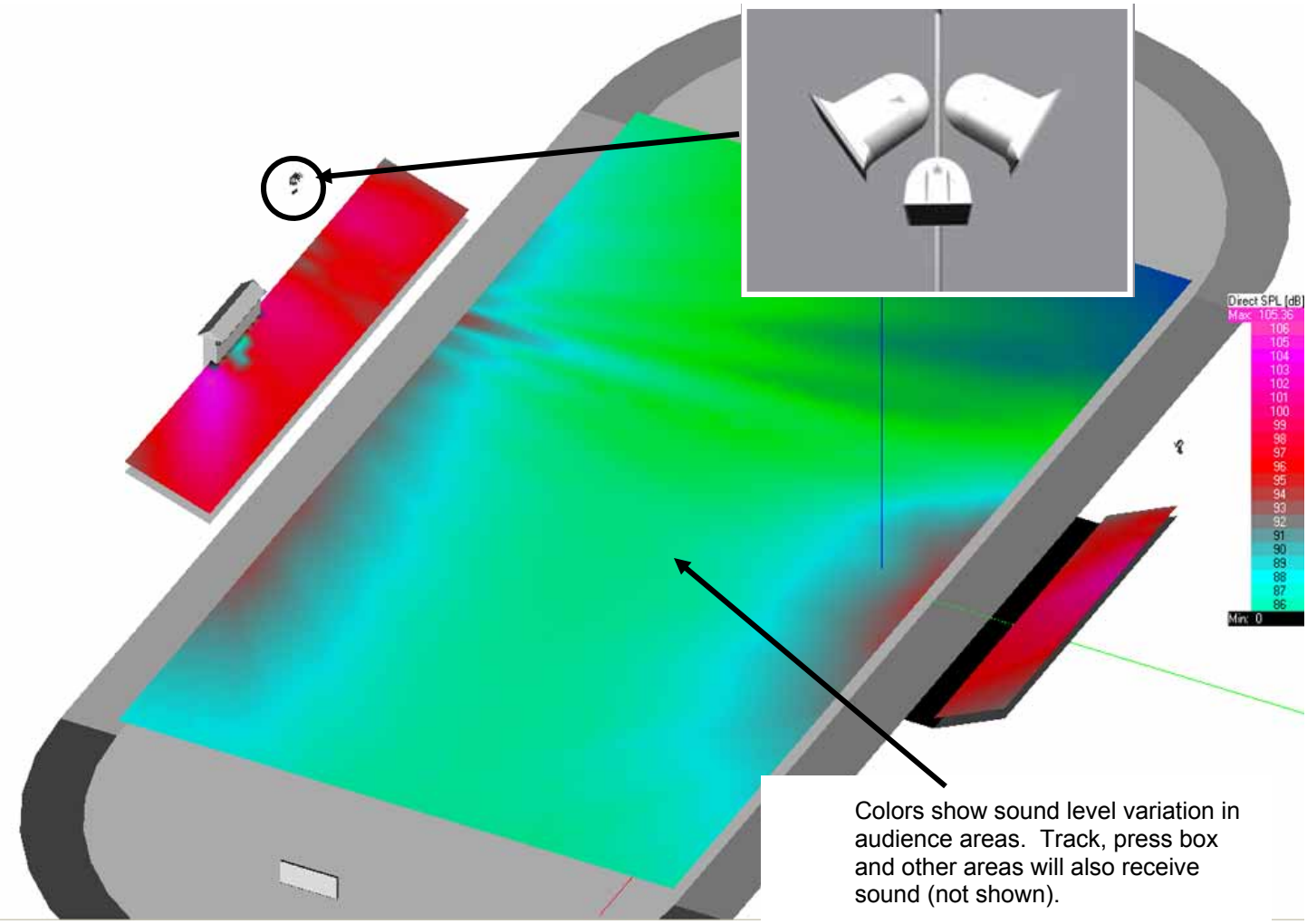
R2

Qty	Model	Comments
2	R2-52Z	Coverage of home and away-team bleachers
System Cost Estimate- $		Based on cost comparison scale: $ = lower cost, $$$$$ = higher cost

SMALL FOOTBALL FIELD #3

SPLIT POINT-SOURCE ON TWO LIGHT POLES

(NOT RECOMMENDED)



Colors show sound level variation in audience areas. Track, press box and other areas will also receive sound (not shown).

DISCUSSION

Community does not recommend a split cluster system of this design because it is very difficult to avoid artificial echoes. Sometimes, however, it's just not possible to cover an entire football field from a single loudspeaker location and there aren't enough loudspeaker locations to allow a proper distributed system design.

In this case, a split-cluster design may be the only solution. The problem with this design is the artificial echoes that will be created in most locations. Any listener that is at least 35 to 70 feet (11m-21m) farther from one cluster than the other will hear an echo. That means, in this design, every listener will hear a confusing echo!

Minimizing Artificial Echoes

Listeners that hear only one cluster will not hear an echo. Thus, to minimize the problem of artificial echoes in this type of system, mount the loudspeakers as high as possible and aim them down at the bleachers. This will minimize the amount of sound from one cluster reaching the opposite bleachers.

The "announcer echo" problem will be present in this system for both press box and field announcers. Follow the recommendations on Page 9 to minimize this problem.

Field Coverage and Neighborhood Spill

This system will have some field coverage from the loudspeakers aimed at the bleachers. Additional field coverage loudspeakers are not recommended for this system because they would exacerbate the artificial echo problem. To minimize neighborhood spill, mount the loudspeakers as high as possible and aim them directly down at the bleachers.

A Better Way

It's likely that both bleachers could be covered from the pole near the home-team bleachers. This would eliminate the artificial echo problem and reduce system costs because there would be no need to run loudspeaker cable to the away-team bleachers area and all loudspeakers could be installed at the same time.

Use a long-throw R2 loudspeaker, such as the R2-52Z, to reach the away-team bleachers. This loudspeaker may be too loud in the home-team bleachers. To minimize this problem, mount the loudspeakers as high as possible and aim the long-throw R2 away from the home-team bleachers.

Alternate Loudspeaker Choices and 70/100 Volt Systems

Add R2SUBZ loudspeakers for extended low frequency response. Most Community R-Series and WET Series loudspeakers are available in 70/100-volt versions. Higher-powered versions, like the R2, can utilize optional (external) 70/100-volt autoformers. This makes it possible to use smaller gauge wire to the loudspeaker location which helps reduce the overall system cost.

R-SERIES LOUDSPEAKERS USED IN THIS DESIGN

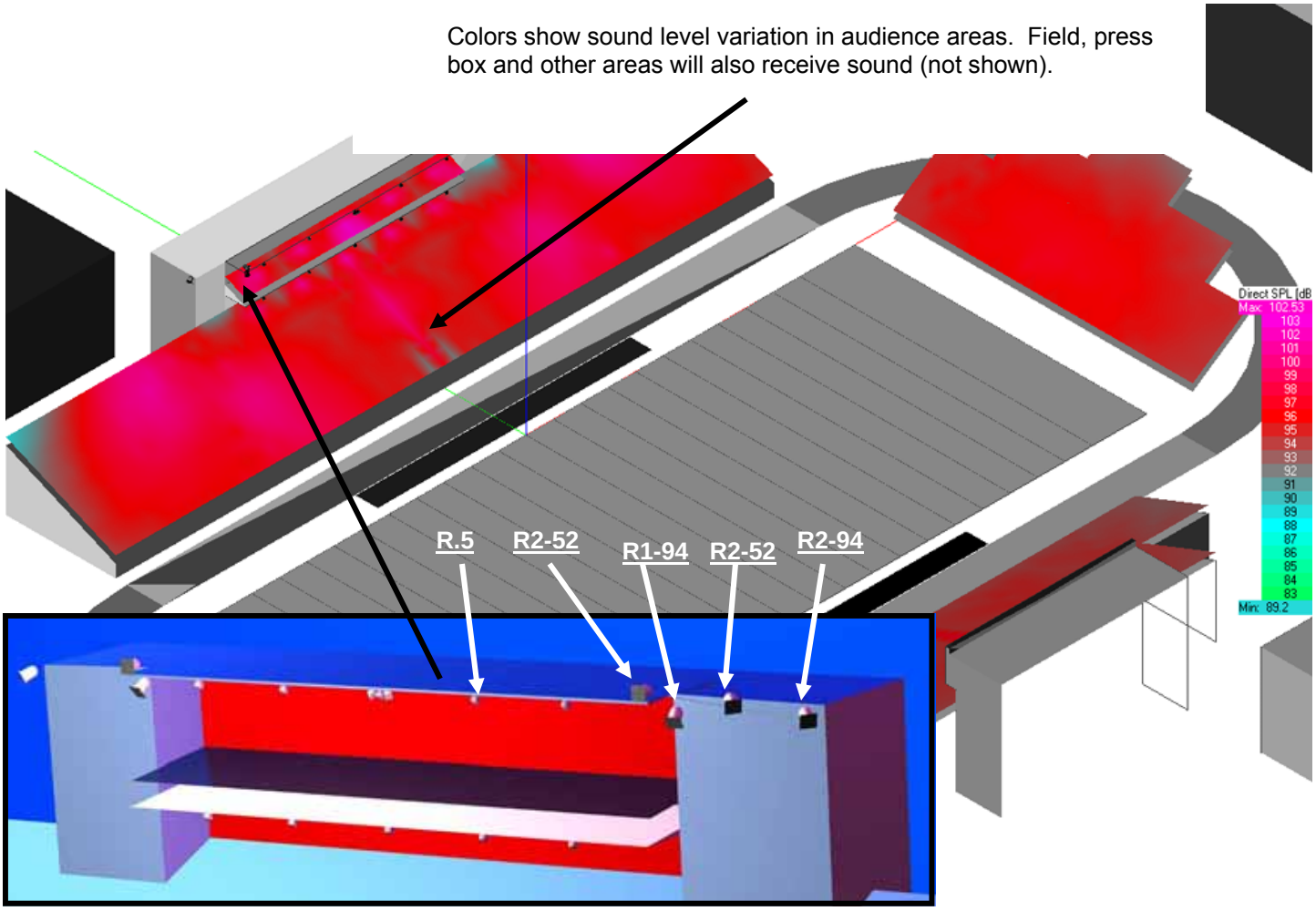
R1

R2

Qty	Model	Comments
2	R.5-66Z	For coverage of the bleachers nearest the poles
3	R2-694Z	For coverage of the field and bleachers farthest from the pole
1	R.5-94Z	For coverage of the home team bleachers right
System Cost Estimate - $$		Based on cost comparison scale: $ = lower cost, $$$$$ = higher cost

LARGE FOOTBALL FIELD #1

SEMI-DISTRIBUTED SYSTEM ON PRESS BOX



DISCUSSION

This is an excellent design for a college or larger high-school football stadium. It combines the best features of a distributed system (for the home-team bleachers) and a point-source system (for the end-zone and away-team bleachers). All of the loudspeakers are in one general location which reduces installation costs and eliminates most artificial echoes. If the electronics rack can be located in the press box, cable lengths are probably short enough to allow use of regular (vs. transformer) R-Series models which reduces overall equipment costs.

If the roof of the press box is less than about 20 feet (6m) above the heads of the nearest listeners, the R2 loudspeakers used for the end-zone and away-team bleachers may be too loud in the home-team bleachers. Look for an alternate location for these loudspeakers when this occurs. Sometimes, there's a light pole behind the press box. This makes a good alternate location for the R2s. Mount the R2s at least 20 feet (6m) above the heads of the nearest listeners (30 feet or 9m is better) and delay the remaining loudspeakers, if necessary, to avoid artificial echoes.

Field Coverage and Neighborhood Spill

This system will have some field coverage from the loudspeakers aimed at the end-zone and away-team bleachers. For additional field coverage, add R2s at the end-zone side of the press box aimed at the field. R2 loudspeakers are available in several coverage patterns for this usage.

There will be some neighborhood spill behind the end-zone and away-team bleachers. To minimize this problem, mount the R2s covering the end-zone and away-team bleachers as high as possible and aim them down at the bleachers. Delay the other loudspeakers, if needed, to avoid an artificial echo.

Feedback, Artificial Echoes and the Announcer's Echo

This type of system should not produce artificial echoes. Real echoes are still possible, of course, so try to aim the loudspeakers away from any nearby walls or buildings.

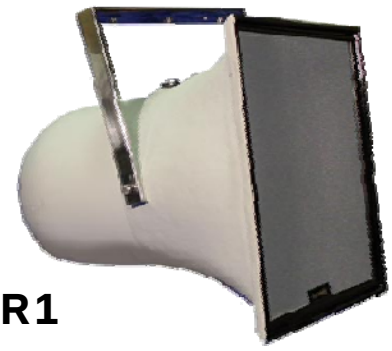
An announcer in the press box will be near the loudspeakers and should not hear an artificial echo. If feedback is a problem, teach the announcer to close-talk the mic or just shut the window. An announcer on the field, however, will hear a confusing "announcer's echo". See Page 9 for ways to minimize this problem.

As a lower-cost, alternative design, substitute Community's R.25-94TZ for the R.5-94TZ. This loudspeaker will cover the press-box audience areas well at a lower level than the R.5-94TZ.

Alternate Loudspeaker Choices and 70/100 Volt Systems

Add R2SUBZ loudspeakers for extended low frequency response. Most Community R-Series and WET Series loudspeakers are available in 70/100-volt versions. Higher-powered versions, like the R2, can utilize optional (external) 70/100-volt autoformers. Use these transformer-coupled versions if the electronics rack is in a remote location.

R-SERIES LOUDSPEAKERS USED IN THIS DESIGN



R1

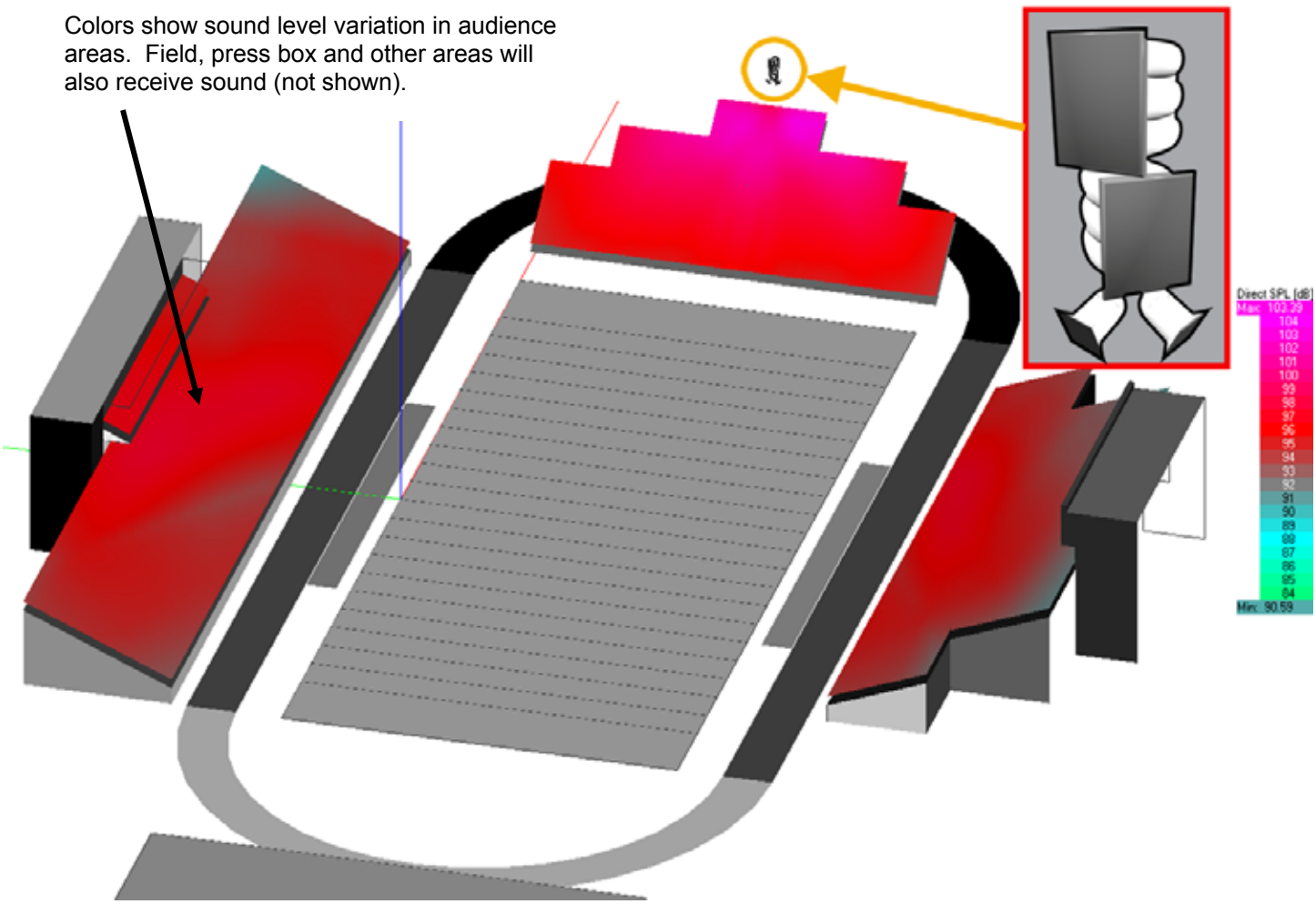
R.5

R2

Qty	Model	Comments
2	R2-94Z	For coverage of the far areas of the home-team bleachers
2	R1-94Z	For coverage of the near areas of the home-team bleachers
3	R2-52Z	For coverage of the end-zone and away-team bleachers
12	R.5-94TZ	For coverage of the home team bleachers center areas
System Cost Estimate - $$$$$		Based on cost comparison scale: $ = lower cost, $$$$$ = higher cost

LARGE FOOTBALL FIELD #2

POINT-SOURCE SYSTEM AT END ZONE



DISCUSSION

When you can cover an entire facility from one location, a point-source system is an excellent choice. In this example, we've covered all three sets of bleachers from the end-zone using only four R-Series loudspeakers. The equipment cost is similar to the previous distributed system and the design is easy to expand for coverage of an opposite end zone bleachers or the field itself.

Feedback, Artificial Echoes and the Announcer's Echo

There's little chance of feedback in this design because the loudspeakers are a long distance from the announcer's microphone. There will be an announcer's echo for announcers located in either the press box or on the field. See Page 9 for a discussion of these problems.

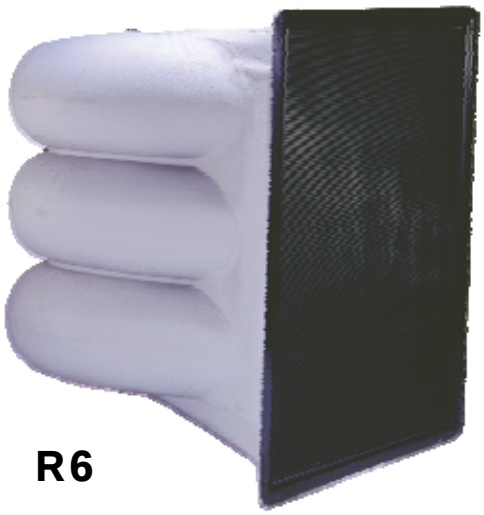
Field Coverage and Neighborhood Spill

This design provides some field coverage. To improve field coverage, add additional R6-51s. Mount the loudspeakers as high as possible and aim them down at the bleachers and field to minimize neighborhood spill.

Alternate Loudspeaker Choices and 70/100 Volt Systems

Add R6-Basshorn loudspeakers for extended low frequency response. Most Community R-Series and WET Series loudspeakers are available in 70/100-volt versions. Higher-powered versions, like the R2 and R6, can utilize optional (external) 70/100-volt autoformers. This makes it possible to use smaller gauge wire to the loudspeaker location which helps reduce the overall system cost.

R-SERIES LOUDSPEAKERS USED IN THIS DESIGN



R6

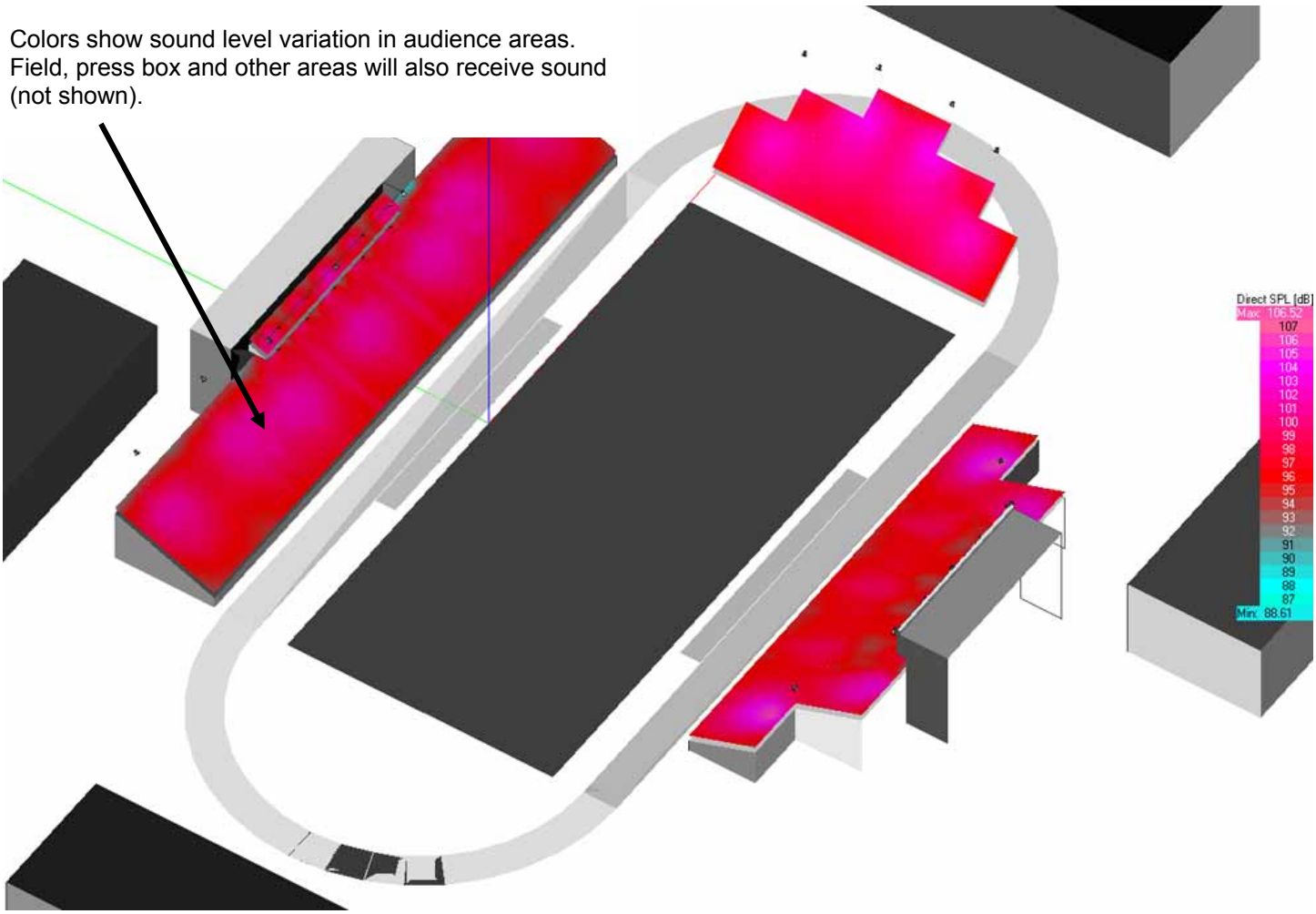
R2

Qty	Model	Comments
2	R2-694Z	For coverage of the end-zone bleachers
2	R6-51BIAMP	For coverage of the home and away-team bleachers
System Cost Estimate - $$$$$		Based on cost comparison scale: $ = lower cost, $$$$$ = higher cost

LARGE FOOTBALL FIELD #3

MULTI-POINT SOURCE SYSTEM ON LIGHT POLES

(NOT RECOMMENDED)



DISCUSSION

Community does not recommend a multi-point system of this design because it is very difficult to avoid artificial echoes. Sometimes, however, it's just not possible to cover an entire football field from a single loudspeaker location and there aren't enough loudspeaker locations to allow a proper distributed system design.

In this case, a multi-point design may be the only solution. The problem with this design is the artificial echoes that will be created in most locations. Any listener that is at least 35 to 70 feet (11m-21m) farther from one loudspeaker than another will hear a confusing echo. That means, in this design, every listener will hear an echo! Some listeners, seated in the top row of bleachers, may hear a full announcement twice. Also, loudspeaker, cabling and installation costs will be high for this system.

Minimizing Artificial Echoes

Listeners that hear only one loudspeaker will not hear an echo. Thus, to minimize the problem of artificial echoes in this type of system, mount the loudspeakers as high as possible and aim them down at the bleachers. This will minimize the amount of sound from one loudspeaker reaching the opposite bleachers.

The “announcer echo” problem will be present in this system for both press box and field announcers. Follow the recommendations on Page 9 to minimize this problem.

Field Coverage and Neighborhood Spill

This system will have some field coverage from the loudspeakers aimed at the bleachers. Additional field coverage loudspeakers are not recommended for this system because they would exacerbate the artificial echo problem. To minimize neighborhood spill, mount the loudspeakers as high as possible and aim them directly down at the bleachers.

A Better Way

Refer to the previous two examples for better ways to cover this stadium.

Alternate Loudspeaker Choices and 70/100 Volt Systems

Add R2SUBZ loudspeakers for extended low frequency response at each position. Most Community R-Series and WET Series loudspeakers are available in 70/100-volt versions. Higher-powered versions, like the R2, can utilize optional (external) 70/100-volt transformers. This makes it possible to use smaller gauge wire to the loudspeaker location which helps reduce the overall system cost.

R-SERIES LOUDSPEAKERS USED IN THIS DESIGN

R.5

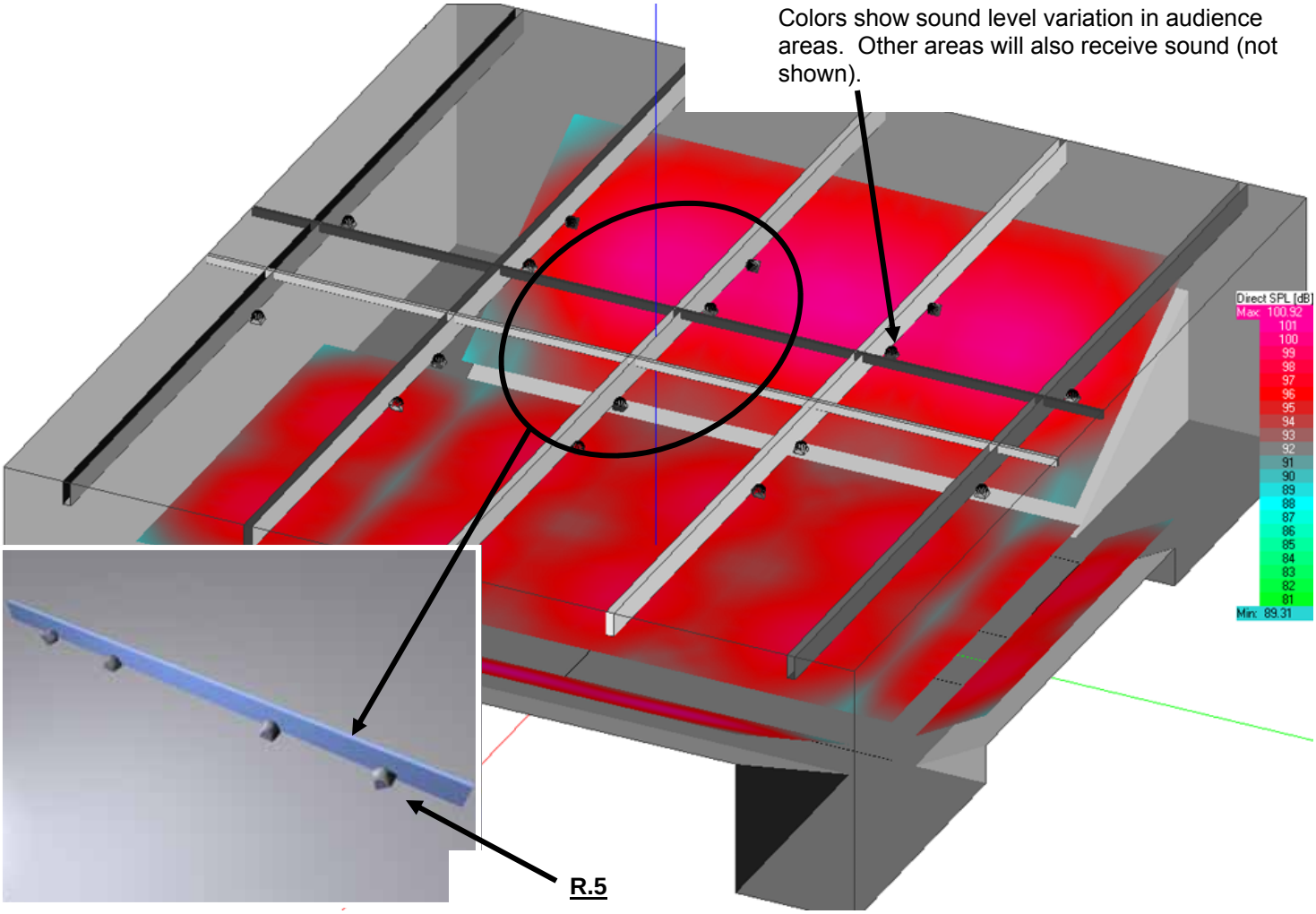
R.25

R2

Qty	Model	Comments
5	R2-52Z	For use on light poles (far-throw)
13	R2-694Z	For use on light poles (mid-throw)
2	R.5HP	For coverage of main bleachers near press box
15	R.25-94Z	For coverage of under-balcony areas near press box
System Cost Estimate - $$$$$		$$$$$ (For comparison only. $ = lower cost, $$$$$ = higher cost

HIGH-SCHOOL GYM #1A

DISTRIBUTED SYSTEM ON CEILING GIRDERS



DISCUSSION

Gymnasium Acoustics

Designing a successful sound system for a school gymnasium is a major challenge. Most, if not all, surfaces are hard and the typical gym has little or no absorption material to quiet the reverberation. This makes it difficult to design a system with good voice intelligibility. Also, students commonly want the system to be loud and musical for their sporting events and "pep rallies". Although it's easy to design a loud system, the gymnasium acoustics make it a challenge to achieve the "musical" goal.

One way to help meet these challenges is to specify absorption material to improve gymnasium acoustics. Absorption material can be sprayed onto the ceiling and girders and absorption panels can be installed on the walls high enough to be out of the way of basketballs or volleyballs.

General System Design Concepts

There are two keys to improving intelligibility and getting good musical sound quality in a gymnasium. First, aim the loudspeakers at the listeners and, as much as possible, keep the sound away from the walls, floor and ceiling. Community R-Series loudspeakers can help in this goal because they provide excellent pattern control. Second, to the extent possible, keep the loudspeakers near the listeners. This improves the direct/reverberant ratio which improves intelligibility. Note

that, in competition gyms, the designer must often comply with sports regulations that may force the loudspeakers to be at or above the ceiling girders.

Distributed Ceiling System

A distributed system, although not the lowest-cost design, offers the best way to achieve these goals. It puts the loudspeakers as close as possible to the listeners and aims them directly at the listeners, away from the walls and ceiling. This design has two rows of loudspeakers, facing downwards, covering the floor and a row of loudspeakers, angled slightly outwards, covering each area of bleachers.

Multi-Purpose Usage

Gymnasiums are often multi-purpose spaces used for sporting events, pep rallies, concerts and dramatic performances and school assemblies. For non-sporting events, a portable stage may be brought in and placed at one end of the gym floor. To minimize feedback, provide switches to turn off loudspeakers pointed at the stage location(s). Also consider a switch to turn off the loudspeakers over the floor. This keeps reverberation down when there's no need for floor coverage.

Alternate Loudspeaker Choices and 70/100 Volt Systems

Add R.5SUB or R2SUBZ loudspeakers for extended low frequency response when students want "hip-hop" or "rock 'n' roll" musical performance. R.5 loudspeakers are available in 70/100-volt versions, as used in this example. However, if wire runs are short enough, it may be possible to use standard versions at a slightly lower cost. Choose amplifiers that are rated for the resulting very low impedance load.

As a lower-cost, alternate design, substitute Community's R.25-94TZ for the R.5-99TZ. The R.25 will cover the area well but at a lower level than the R.5.

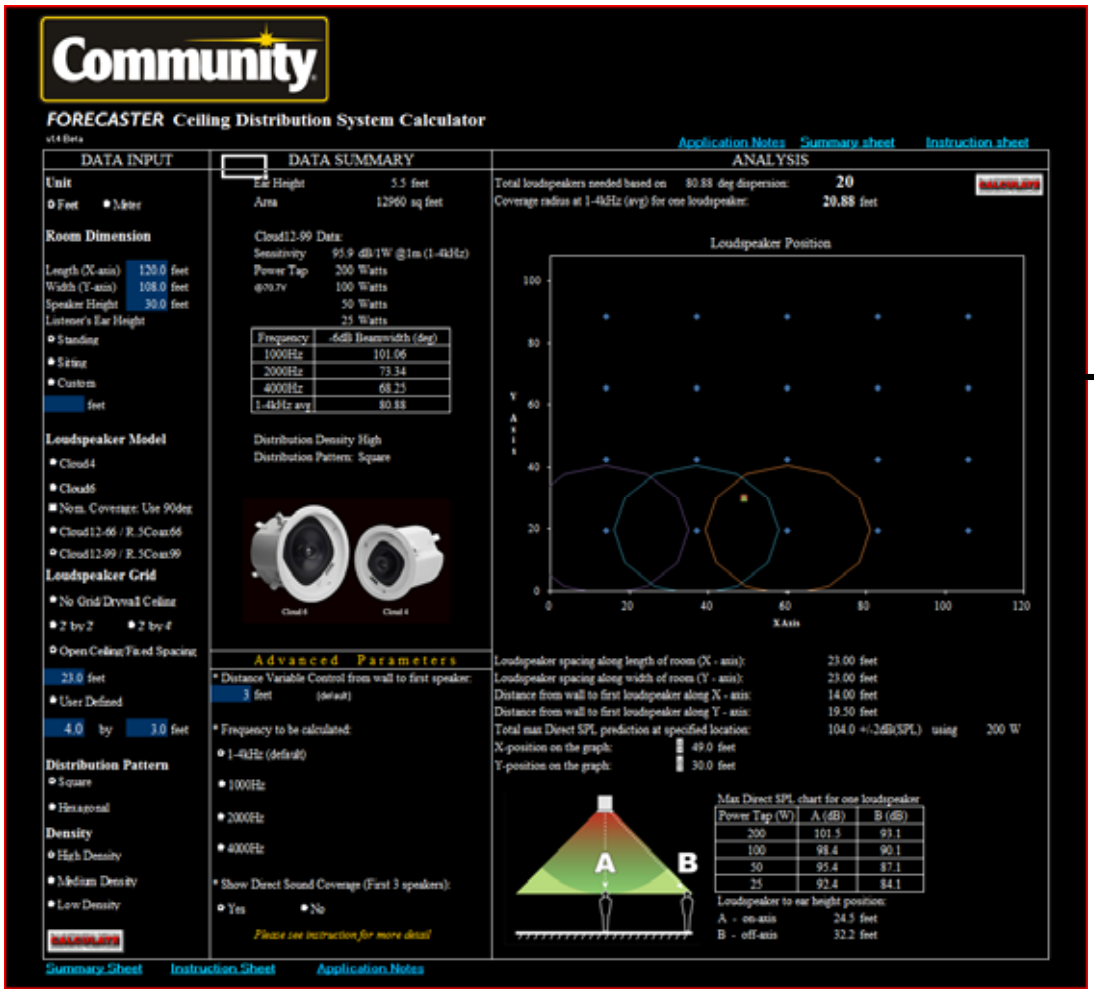
R-SERIES LOUDSPEAKERS USED IN THIS DESIGN

R.5

Qty	Model	Comments
16	R.5-99TZ	For coverage of all areas (70/100 volt transformer included)
System Cost Estimate - $$$		Based on cost comparison scale: $ = lower cost, $$$$$ = higher cost

HIGH-SCHOOL GYM #1B

DISTRIBUTED SYSTEM ON CEILING GIRDERS



DISCUSSION

The purpose of this system design is to show the capabilities of Community's "FORECASTER Ceiling System Program", A Microsoft Excel spreadsheet that calculates the quantity and location of loudspeakers used in a ceiling-type distributed system. Note that the R.5COAX99 and R.5COAX66 are equivalent to the CLOUD1299 and CLOUD1266 for coverage calculations.

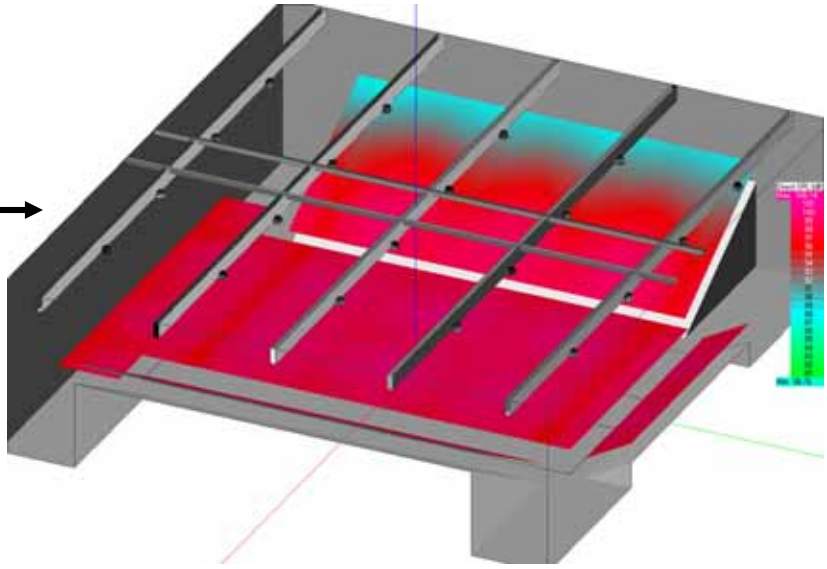
In High-School Gym #1A, the two outside rows of loudspeakers are pointed outwards at the bleachers. This allows the system to use only four rows of loudspeakers. In System #1B, all of the loudspeakers point straight down. For this reason, the system needs five rows of loudspeakers to achieve full coverage. Intelligibility may be better with this system because the loudspeakers over the bleachers are closer to the listeners which creates a better direct/reverberant ratio.

Using FORECASTER in Rooms With Sloped Floors

This high-school gym doesn't have a sloped floor. However, the bleachers put listeners closer to the ceiling so the system design is very similar to a room with a sloped floor.

To deal with this kind of challenge using FORECASTER, divide the room into separate sections and treat them as separate rooms in the Ceiling System Software. In this gymnasium example, one "room" would be the gym floor and each set of bleachers would be another "room". Change the ceiling height for the bleachers "room" to be an average head height for the listeners in the bleachers. Since this will be a lower height than the main floor, the rows covering the bleachers will have more loudspeakers than the rows covering the main floor.

Download the FORECASTER Ceiling System Program from the CLOUD Series product page at www.CommunityPro.com



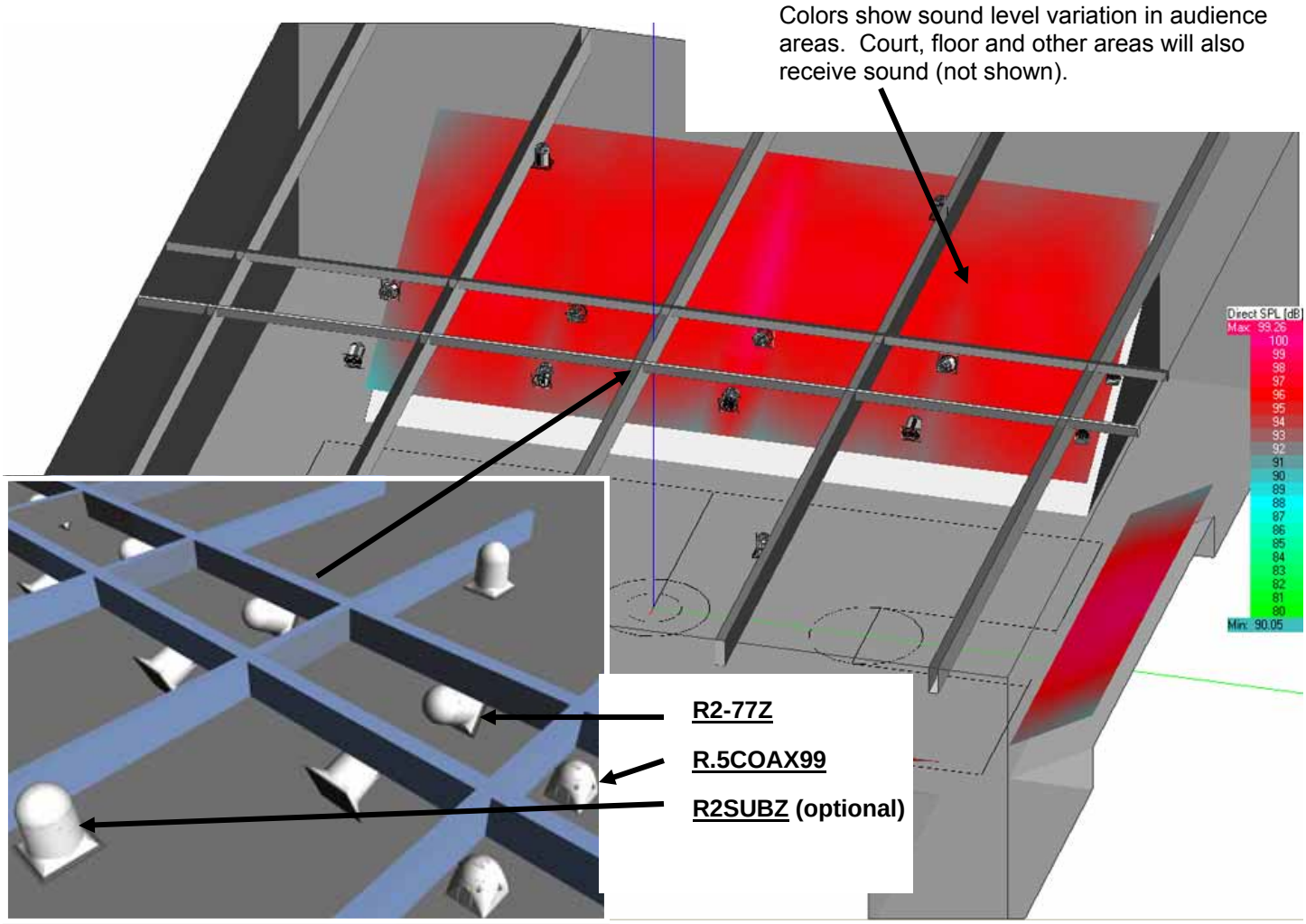
R-SERIES LOUDSPEAKERS USED IN THIS DESIGN

R.5COAX

Qty	Model	Comments
20	R.5COAX99T	For coverage of all areas (70/100 volt transformer included)
System Cost Estimate - $$$		Based on cost comparison scale: $ = lower cost, $$$$$ = higher cost

HIGH-SCHOOL GYM #2

SIMPLIFIED DISTRIBUTED SYSTEM ON CEILING GIRDERS



DISCUSSION

Gymnasium Acoustics

Designing a successful sound system for a school gymnasium is a major challenge. Most, if not all, surfaces are hard and the typical gym has little or no absorption material to quiet the reverberation. This makes it difficult to design a system with good voice intelligibility. Also, students commonly want the system to be loud and musical for their sporting events and "pep rallies". Although it's easy to design a loud system, the gymnasium acoustics make it a challenge to achieve the "musical" goal.

One way to help meet these challenges is to specify absorption material to improve gymnasium acoustics. Absorption material can be sprayed onto the ceiling and girders and absorption panels can be installed on the walls high enough to be out of the way of basketballs or volleyballs.

General System Design Concepts

There are two keys to improving intelligibility and getting good musical sound quality in a gymnasium. First, aim the loudspeakers at the listeners and, as much as possible, keep the sound away from the walls, floor and ceiling. Community R-Series loudspeakers can help in this goal because they provide excellent pattern control. Second, to the extent possible, keep the loudspeakers near the listeners. This improves the direct/reverberant ratio which improves intelligibility. Note

that, in competition gyms, the designer must often comply with sports regulations that may force the loudspeakers to be at or above the ceiling girders.

Simplified Distributed System (not Suitable for Multi-Purpose Use)

This design has a row of loudspeakers aimed at each set of bleachers. This design is simplified from the previous design because there are no floor-coverage loudspeakers. Because of the lack of floor coverage, this design is less suitable for a multi-purpose gym. However, it may be a good option for a competition gym that is only used for sports. Musical sound quality will be excellent. Voice intelligibility will be very good but not quite as good as the previous example which had the loudspeakers closer to the listeners. Note the R.5COAX99 loudspeakers that cover the concessions area. Use delay to synchronize these loudspeakers with the main loudspeakers.

Alternate Loudspeaker Choices and 70/100 Volt Systems

The R2 loudspeakers used in this example are high-power devices that can easily produce "hip-hop" or "rock 'n' roll" levels in large gymnasiums. When level requirements are lower, substitute the Community R1-66Z for the R2-77Z. The R1 loudspeaker series offers excellent pattern control at a lower price.

Add R2SUBZ loudspeakers for extended low frequency response when students want "rock 'n' roll" musical performance. Note the position of the optional subwoofers in the diagram on the opposite page. Locating the subs directly over the audience allows them to be operated at a lower level which reduces the room reverberation.

Accessory 70/100-volt transformers are available for R2 loudspeakers. However, if wire runs are short enough, it may be possible to eliminate the transformers and reduce the system cost. Choose amplifiers that are rated for the resulting low impedance load.

R-SERIES LOUDSPEAKERS USED IN THIS DESIGN

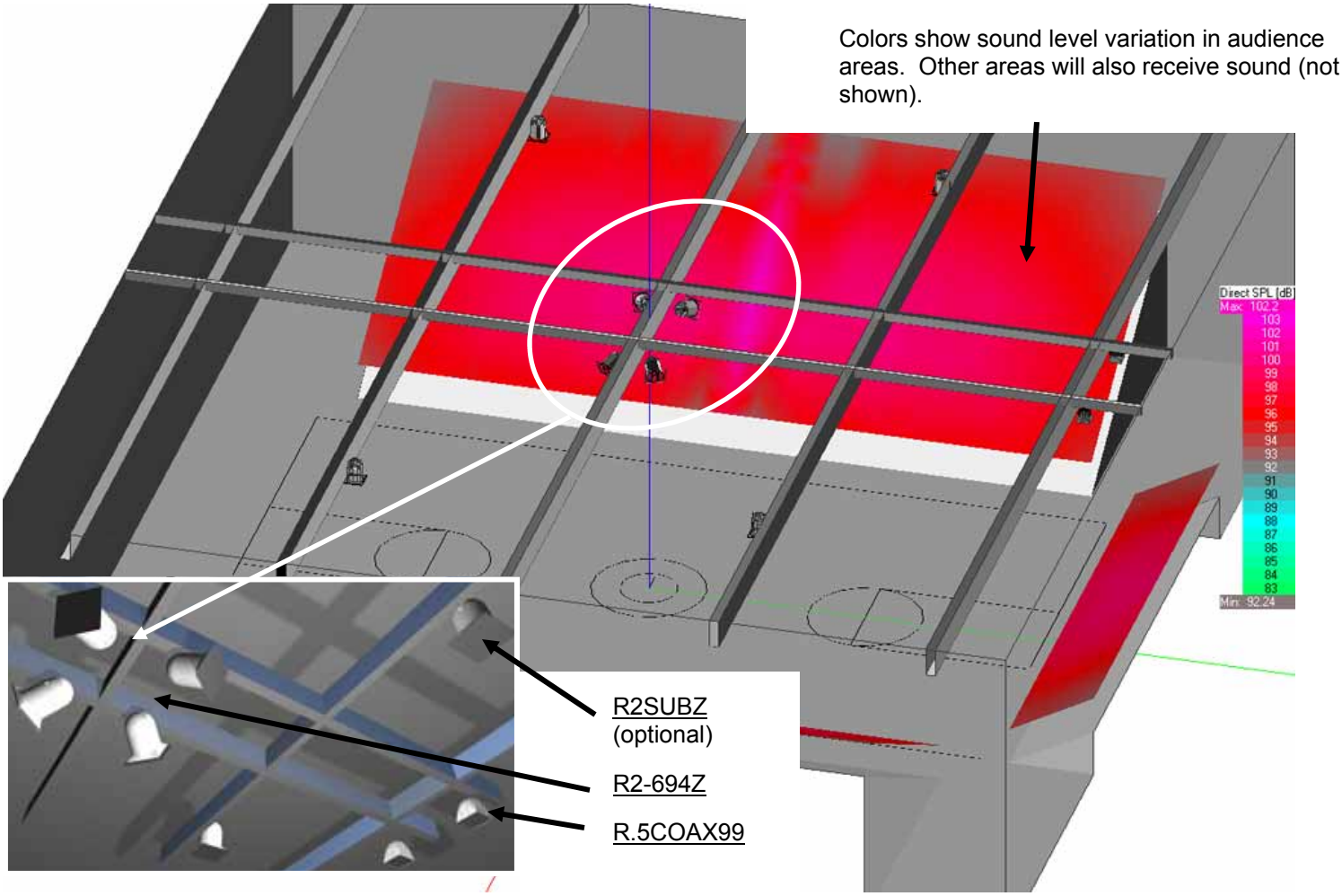
R.5COAX

R2

Qty	Model	Comments
8	R2-77Z	For coverage of bleachers
2	R.5COAX99	For coverage of concessions (use delay to synchronize with main loudspeakers)
System Cost Estimate - $$$$		Based on cost comparison scale: $ = lower cost, $$$$$ = higher cost

HIGH-SCHOOL GYM #3

POINT-SOURCE SYSTEM ON CEILING GIRDERS



DISCUSSION

Gymnasium Acoustics

Designing a successful sound system for a school gymnasium is a major challenge. Most, if not all, surfaces are hard and the typical gym has little or no absorption material to quiet the reverberation. This makes it difficult to design a system with good voice intelligibility. Also, students commonly want the system to be loud and musical for their sporting events and "pep rallies". Although it's easy to design a loud system, the gymnasium acoustics make it a challenge to achieve the "musical" goal.

One way to help meet these challenges is to specify absorption material to improve gymnasium acoustics. Absorption material can be sprayed onto the ceiling and girders and absorption panels can be installed on the walls high enough to be out of the way of basketballs or volleyballs.

General System Design Concepts

There are two keys to improving intelligibility and getting good musical sound quality in a gymnasium. First, aim the loudspeakers at the listeners and, as much as possible, keep the sound away from the walls, floor and ceiling. Community R-Series loudspeakers can help in this goal because they provide excellent pattern control. Second, to the extent possible, keep the loudspeakers near the listeners. This improves the direct/reverberant ratio which improves intelligibility. Note

that, in competition gyms, the designer must often comply with sports regulations that may force the loudspeakers to be at or above the ceiling girders.

Point-Source System

A point-source system is usually the lowest-cost option for any facility. The point-source system in this example will provide ample level and excellent musical sound quality with good voice intelligibility. In comparison, the Ceiling Distributed design (High-School Gym #1) will provide better voice intelligibility and more flexibility for multipurpose use at somewhat higher cost. Note the R.5COAX99 loudspeakers that cover the end zone area. Use delay to synchronize these loudspeakers with the main loudspeakers.

Multi-Purpose Usage

The four center-mounted loudspeakers will provide adequate floor coverage for pep rallies but this system is not designed for uses where an audience is sitting in chairs on the floor.

Alternate Loudspeaker Choices and 70/100 Volt Systems

The R2 loudspeakers used in this example are high-power devices that can easily produce "rock 'n' roll" levels in large gymnasiums. When level requirements are lower, consider the Community R1 loudspeaker series which offers excellent pattern control at a lower price.

Add R2SUBZ loudspeakers for extended low frequency response when students want "rock 'n' roll" musical performance. Accessory 70/100-volt transformers are available for R2 loudspeakers. However, if wire runs are short enough, it may be possible to eliminate the transformers and reduce the system cost. Choose amplifiers that are rated for the resulting low impedance load. This example also shows an optional pair of R.5 loudspeakers used to cover end-zone seating.

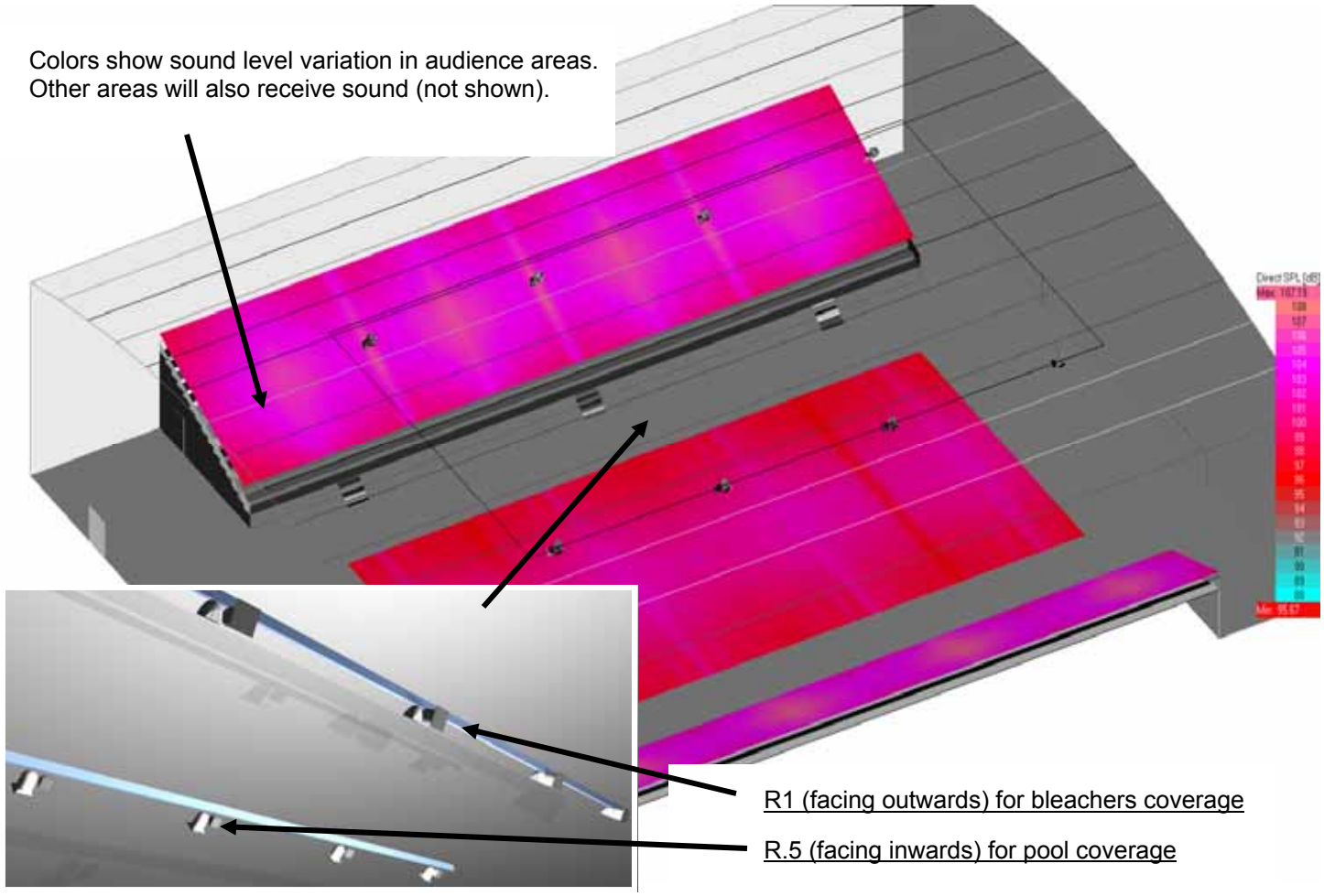
R-SERIES LOUDSPEAKERS USED IN THIS DESIGN

R.5COAX

R2

Qty	Model	Comments
4	R2-694Z	For coverage of bleachers
2	R.5COAX99	For coverage of end zone (use delay to synchronize with main loudspeakers)
System Cost Estimate - $$		Based on cost comparison scale: $ = lower cost, $$$$$ = higher cost

COMPETITION INDOOR SWIMMING POOL
DISTRIBUTED SYSTEM ON CEILING GIRDERS


Colors show sound level variation in audience areas.
Other areas will also receive sound (not shown).
R1 (facing outwards) for bleachers coverage
R.5 (facing inwards) for pool coverage

DISCUSSION

Indoor Swimming Pool Acoustics

Designing a successful sound system for an indoor swimming pool (also called a "natatorium") is a major challenge. Much like a typical gymnasium, most, if not all, surfaces are hard and there is little or no absorption material to quiet the reverberation. This makes it difficult to design a system with good voice intelligibility. Also, students commonly want the system to be loud and musical. Although it's easy to design a loud system, the room acoustics make it a challenge to achieve the "musical" goal.

One way to help meet these challenges is to specify absorption material to improve pool acoustics. Absorption material can be sprayed onto the ceiling and girders and absorption panels can be installed on the walls. Such panels should be treated to resist moisture, pool chemicals and mold and mildew.

General System Design Concepts

There are two keys to improving intelligibility and getting good musical sound quality in an indoor swimming pool. First, aim the loudspeakers at the listeners and, as much as possible, keep the sound away from the walls, floor, ceiling and the water itself. Community R-Series loudspeakers can help in this goal because they provide excellent pattern control. Second, to the extent possible, keep the loudspeakers near the listeners. This improves the direct/reverberant ratio which improves intelligibility.

Distributed System

A distributed system is usually the best way to achieve these goals. The distributed system in this example will provide ample level and excellent musical sound quality with good voice intelligibility. Position the two outside rows of loudspeakers directly over the bleachers if possible to improve the direct/reverberant ratio. Provide a switch to turn off the loudspeakers over the pool when they are not needed. This will reduce reverberation buildup in the space.

Alternate Loudspeaker Choices and 70/100 Volt Systems

The R.5 loudspeakers used in this example will provide ample level for most uses. For "rock 'n' roll" levels, consider Community R.5 subwoofers. R.5 models are available in 70/100-volt versions as used in this example.

Alternate (Lower-Cost) Design for High-School Swimming Pool

The design example shown here is for a large, competition swimming pool with two sets of bleachers. This type of facility would be common for NCAA sporting events, Olympic facilities and professional water sports.

In contrast, a typical high-school swimming pool is a smaller space with a single set of bleachers. A good loudspeaker system design for this kind of smaller swimming pool is similar to one-half of the design shown for the competition pool. For the smaller pool, Community's R.5-94Z (or TZ) is a good choice for the bleachers and for the pool coverage.

R-SERIES LOUDSPEAKERS USED IN THIS DESIGN

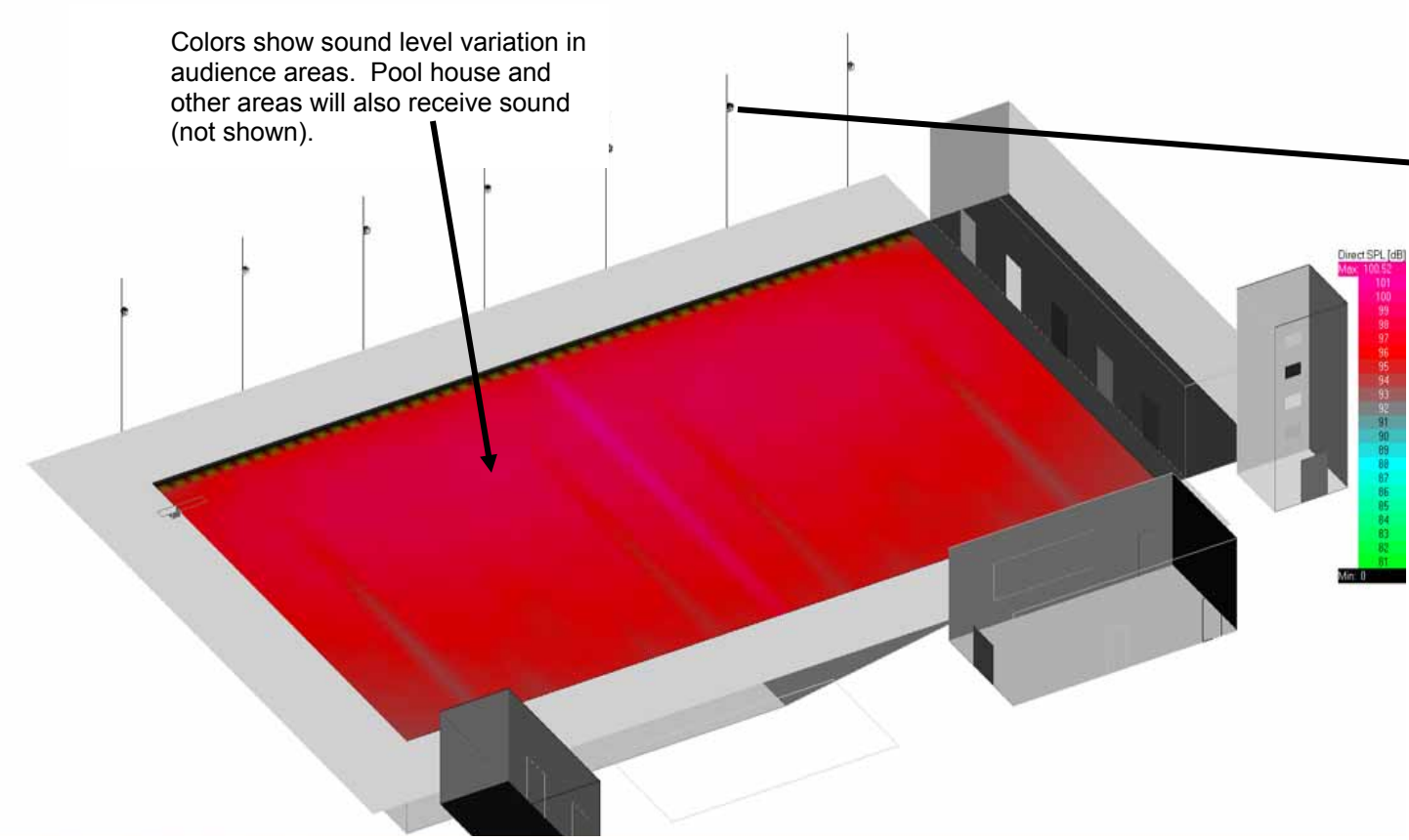
R.5

R2

Qty	Model	Comments
8	R2-77Z	For bleachers coverage
8	R.5-66TZ	For pool coverage
System Cost Estimate - $$$$$		Based on cost comparison scale: $ = lower cost, $$$$$ = higher cost

OUTDOOR SWIMMING POOL #1

DISTRIBUTED SYSTEM ON LIGHT POLES


Colors show sound level variation in audience areas. Pool house and other areas will also receive sound (not shown).
Direct SPL [dB]

DISCUSSION

This is an excellent design for an outdoor swimming pool. The loudspeakers are mounted on light poles on one side of the pool. This keeps levels very even throughout the pool area, improves intelligibility for announcements and minimizes neighborhood spill.

Feedback, Artificial Echoes, the Announcer's Echo and Neighborhood Spill

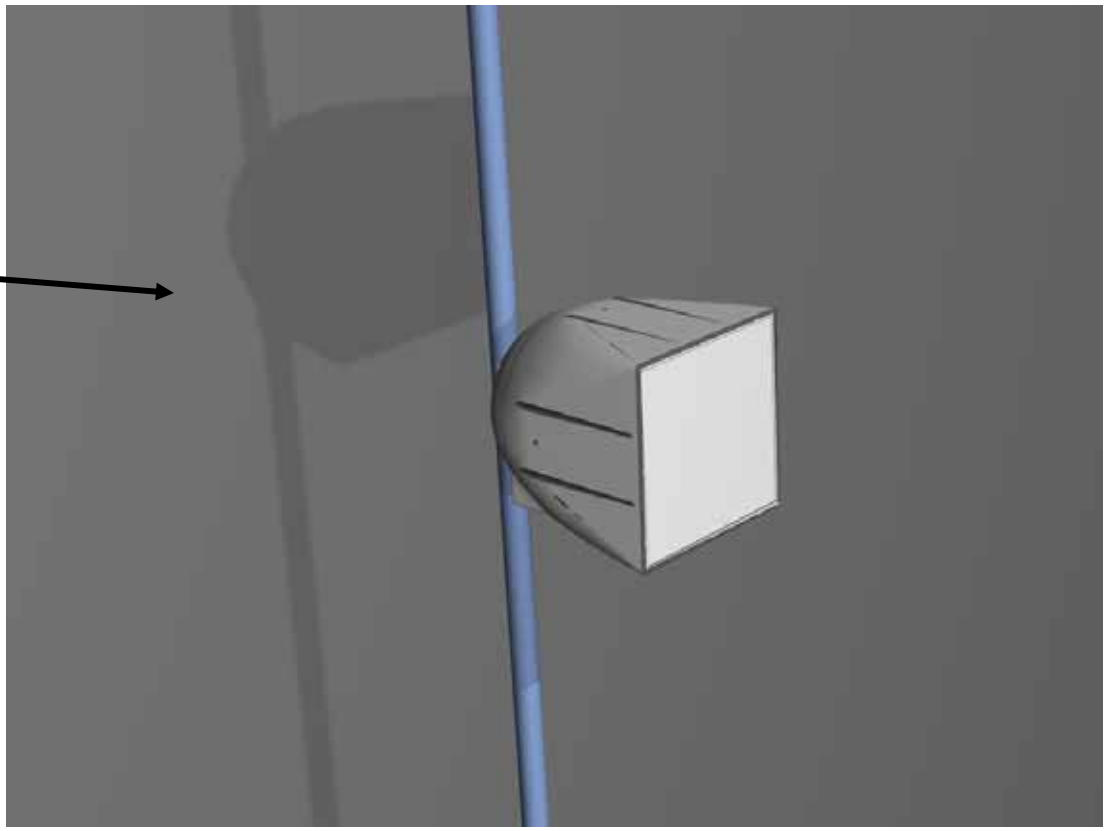
This type of system will not produce artificial echoes. Real echoes are still possible, of course, so try to aim the loudspeakers away from any nearby walls or buildings including the pool house.

An announcer in the main pool house will be near the loudspeakers and should not hear an artificial echo. If feedback is a problem, teach the announcer to close-talk the mic or just shut the window. For most pools, an announcer with a wireless mic in the pool area will not hear an announcer's echo.

To minimize neighborhood spill, mount the loudspeakers as high as possible and aim them downward towards the pool.

Alternate Loudspeaker Choices and 70/100 Volt Systems

The R.25 loudspeakers in this example will provide adequate level for most announcing requirements and their musical sound quality is excellent. For "hip-hop" or "rock and roll" levels, consider Community's R.5 Series with the R.5SUB for extended low frequency response. The R.5s also have improved pattern control which will help reduce neighborhood spill. The R.5SUB may also be added to the R.25 system. R.25 and R.5 Series loudspeakers are available in 70/100-volt versions as used in this example.



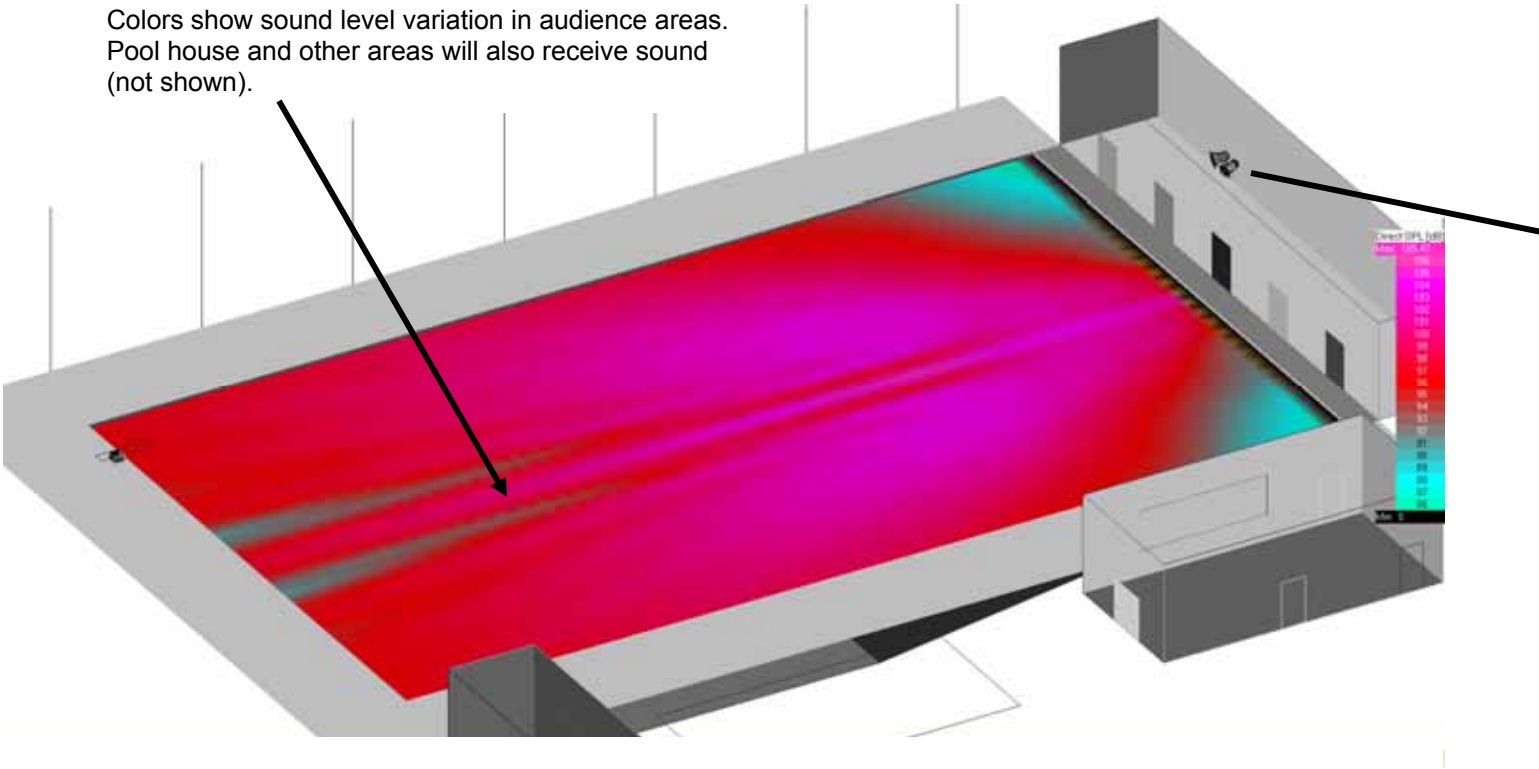
R-SERIES LOUDSPEAKERS USED IN THIS DESIGN

R.25

Qty	Model	Comments
7	R.25-94TZ	For coverage of entire pool area
System Cost Estimate - $		Based on cost comparison scale: $ = lower cost, $$$$$ = higher cost

OUTDOOR SWIMMING POOL #2

POINT-SOURCE SYSTEM ON POOL-HOUSE ROOF



DISCUSSION

When you can cover an entire facility from one location, a point-source system is almost always the most economical choice. In this example, we've covered the entire pool area using only two R-Series loudspeakers. The equipment cost is lower than the previous distributed system and the installation costs will be lower as well.

Feedback, Artificial Echoes, the Announcer's Echo and Neighborhood Spill

This type of system will not produce artificial echoes. Real echoes are still possible, of course, so try to aim the loudspeakers away from any nearby walls or buildings.

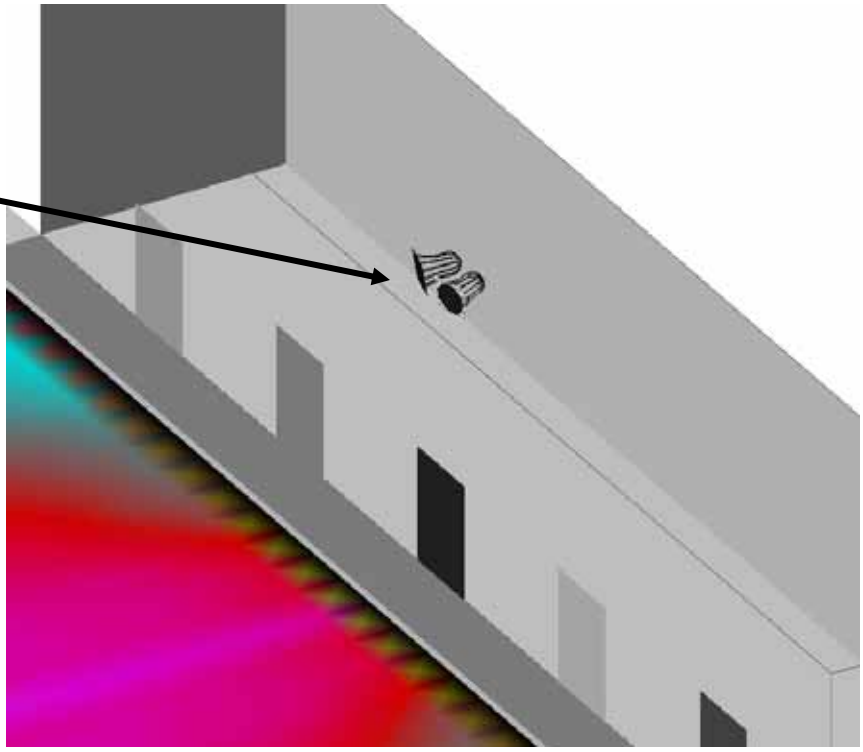
An announcer in the main pool house will be near the loudspeakers and should not hear an artificial echo. If feedback is a problem, teach the announcer to close-talk the mic or just shut the window. For very long pools, an announcer with a wireless mic at the far end of the pool may hear an announcer's echo. See Page 9 for a discussion of this problem.

To minimize neighborhood spill, mount the loudspeakers as high as possible and aim them downward towards the pool.

Alternate Loudspeaker Choices and 70/100 Volt Systems

The R1 loudspeakers in this example will provide adequate level for most announcing requirements and their musical sound quality is excellent. For "rock 'n' roll" levels, add Community's R2SUBZ for extended low frequency response.

If the equipment rack cannot be located in the pool house, R.25 and R.5 Series loudspeakers are available in 70/100-volt versions for the required long cable runs.



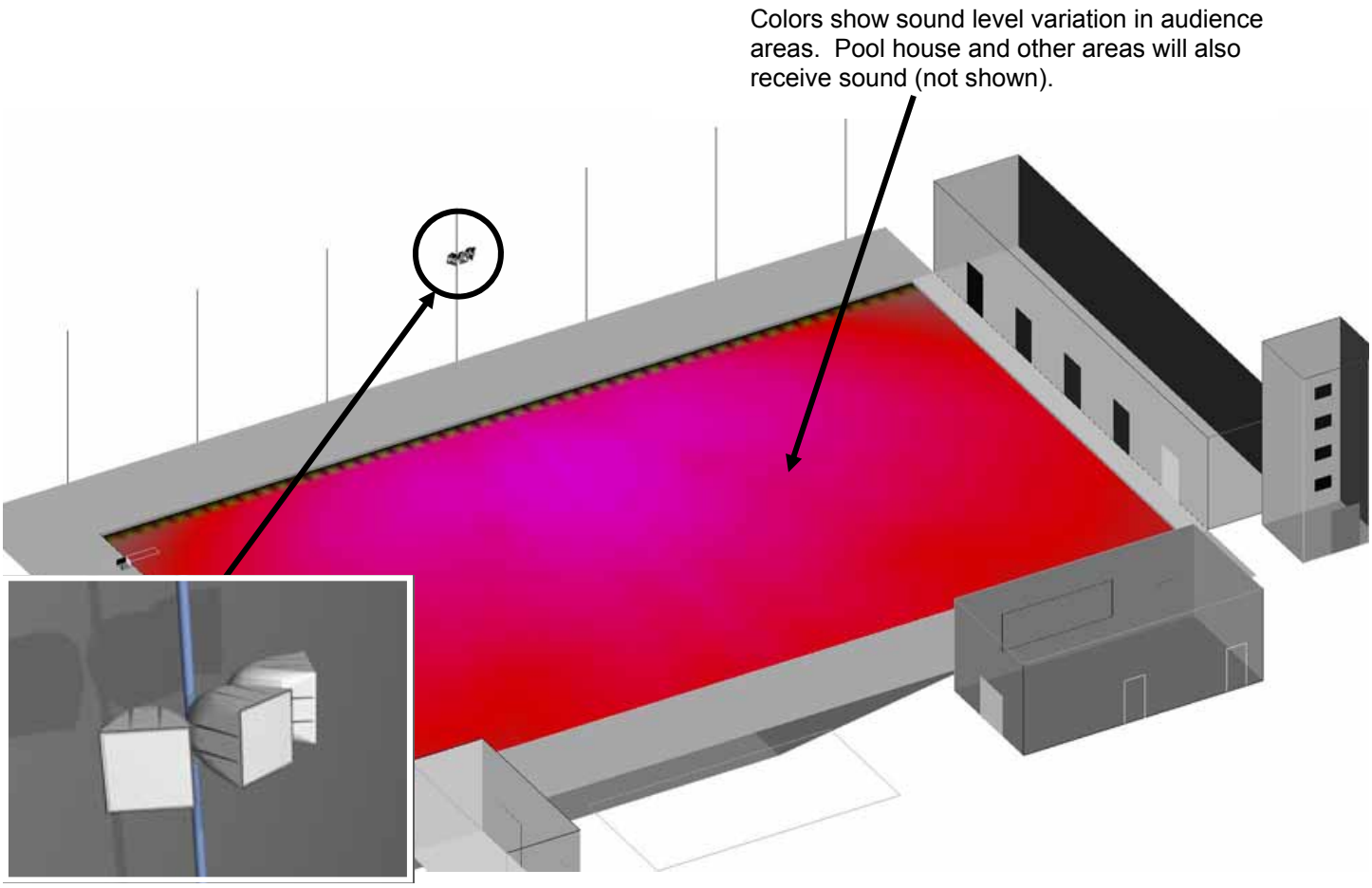
R-SERIES LOUDSPEAKERS USED IN THIS DESIGN

R1

Qty	Model	Comments
2	R1-64Z	For coverage of entire pool area
System Cost Estimate - $		Based on cost comparison scale: $ = lower cost, $$$$$ = higher cost

OUTDOOR SWIMMING POOL #3

POINT-SOURCE SYSTEM ON CENTER LIGHT POLE



DISCUSSION

Sometimes, it won't be possible to locate a loudspeaker cluster on a pool-house roof (see previous example). In this case, consider a point-source system on a light pole as shown here. This design uses only three R-Series loudspeakers to cover the entire pool.

Feedback, Artificial Echoes, the Announcer's Echo and Neighborhood Spill

This type of system will not produce artificial echoes. Real echoes are still possible, of course, so try to aim the loudspeakers away from any nearby walls or buildings including the pool house.

An announcer in the main pool house may hear an artificial echo. If this is a problem, provide the announcer with a nearby monitor speaker or headphones or just shut the window. For very long pools, an announcer with a wireless mic at the far end of the pool may hear an announcer's echo. See Page 9 for a discussion of this problem.

To minimize neighborhood spill, mount the loudspeakers as high as possible and aim them downward towards the pool.

Alternate Loudspeaker Choices and 70/100 Volt Systems

The R.5 loudspeakers in this example will provide adequate level for most announcing requirements and their musical sound quality is excellent. For "rock 'n' roll" levels, add Community's R.5SUBs for extended low frequency response. R.5 Series loudspeakers are available in 70/100-volt versions for the required long cable runs (as used in this example).

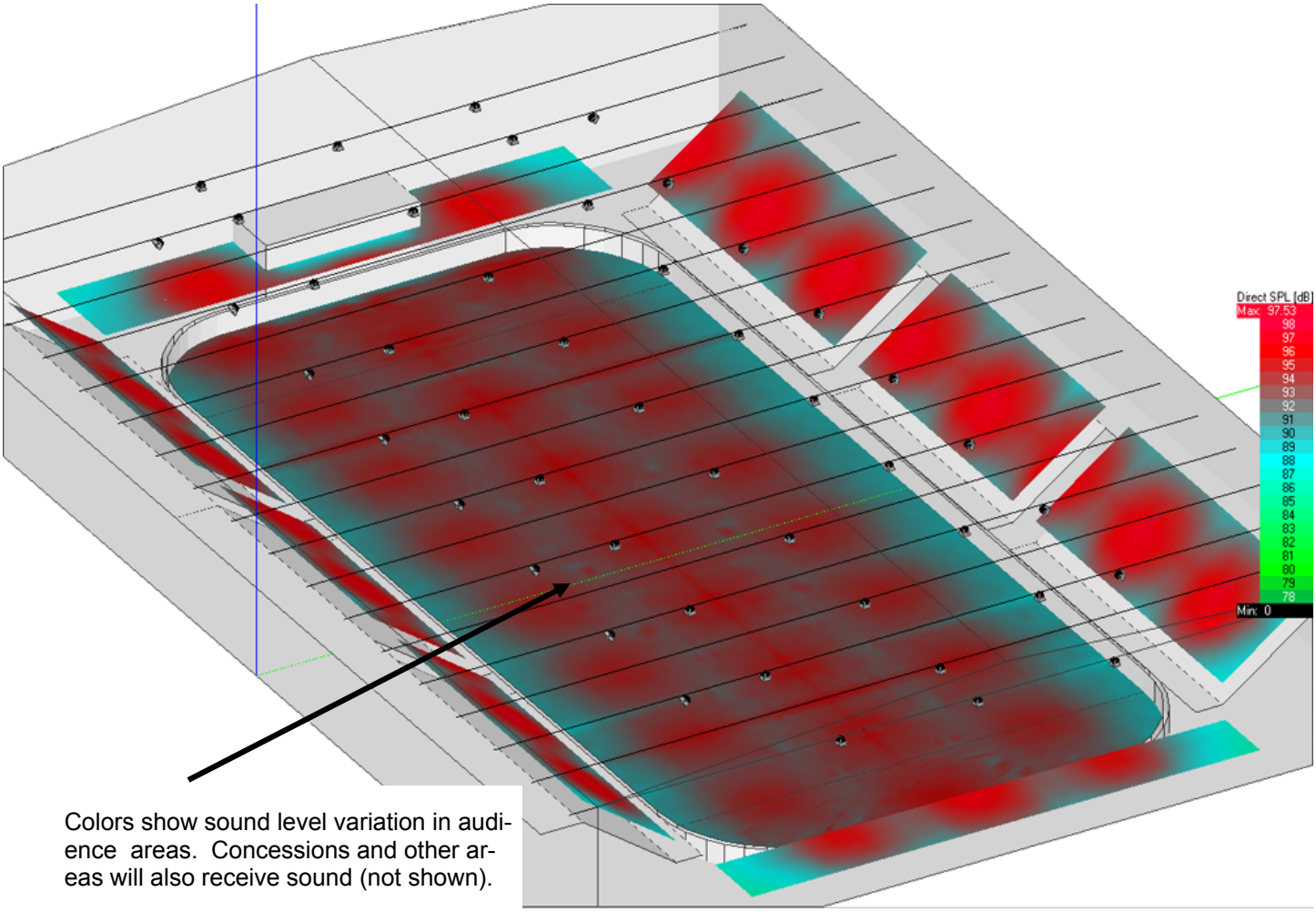
R-SERIES LOUDSPEAKERS USED IN THIS DESIGN

R.5

Qty	Model	Comments
3	R.5-94TZ	For coverage of entire pool area
System Cost Estimate - $		Based on cost comparison scale: $ = lower cost, $$$$$ = higher cost

INDOOR ICE RINK #1

CEILING DISTRIBUTED SYSTEM ON ROOF BEAMS



Colors show sound level variation in audience areas. Concessions and other areas will also receive sound (not shown).

DISCUSSION

Ice Rink Acoustics

Designing a successful sound system for an indoor ice rink is a major challenge. Most, if not all, surfaces are hard and the typical facility has little or no absorption material to quiet the reverberation. This makes it difficult to design a system with good voice intelligibility. Also, patrons commonly want the system to be loud and musical for sporting events. Although it's easy to design a loud system, the facility acoustics make it difficult to achieve the "musical" goal.

One way to help meet these challenges is to specify absorption material to improve facility acoustics. Absorption material can be sprayed onto the ceiling and girders and absorption panels can be installed on the walls.

General System Design Concepts

There are two keys to improving intelligibility and getting good musical sound quality in a space like this. First, aim the loudspeakers at the listeners and, as much as possible, keep the sound away from the walls, floor and ceiling. Community R-Series loudspeakers can help in this goal because they provide excellent pattern control. Second, to the extent possible, keep the loudspeakers near the listeners. This improves the direct/reverberant ratio which improves intelligibility.

Distributed Ceiling System

A distributed system, although not the lowest-cost design, offers the best way to achieve these goals. It puts the loudspeakers as close as possible to the listeners and aims them directly at the listeners, away from the walls and ceiling. This design has three rows of loudspeakers: facing downwards, covering the floor and two rows of loudspeakers, angled slightly outwards, covering the bleachers areas. Note the extra loudspeakers covering the concessions area at one end of the floor.

Multi-Purpose Usage (Small Arena)

An ice rink like this may be a multi-purpose arena. Different floors are installed for many different kinds of events. These may include ice hockey, arena football, musical concerts, conventions with display booths and rodeos and circus performances.

For non-sporting events, a portable stage may be brought in and placed at one end of the arena floor. To minimize feedback, provide switches to turn off loudspeakers pointed at the stage location(s). Also consider a switch to turn off the loudspeakers over the floor. This keeps reverberation down when there's no need for floor coverage.

Alternate Loudspeaker Choices and 70/100 Volt Systems

Add R2SUBZ loudspeakers for extended low frequency response when patrons want "rock 'n' roll" musical performance. R.5 loudspeakers are available in 70/100-volt versions, as used in this example. However, if wire runs are short enough, it may be possible to use standard versions at a slightly lower cost. Choose amplifiers that are rated for the resulting very low impedance load.

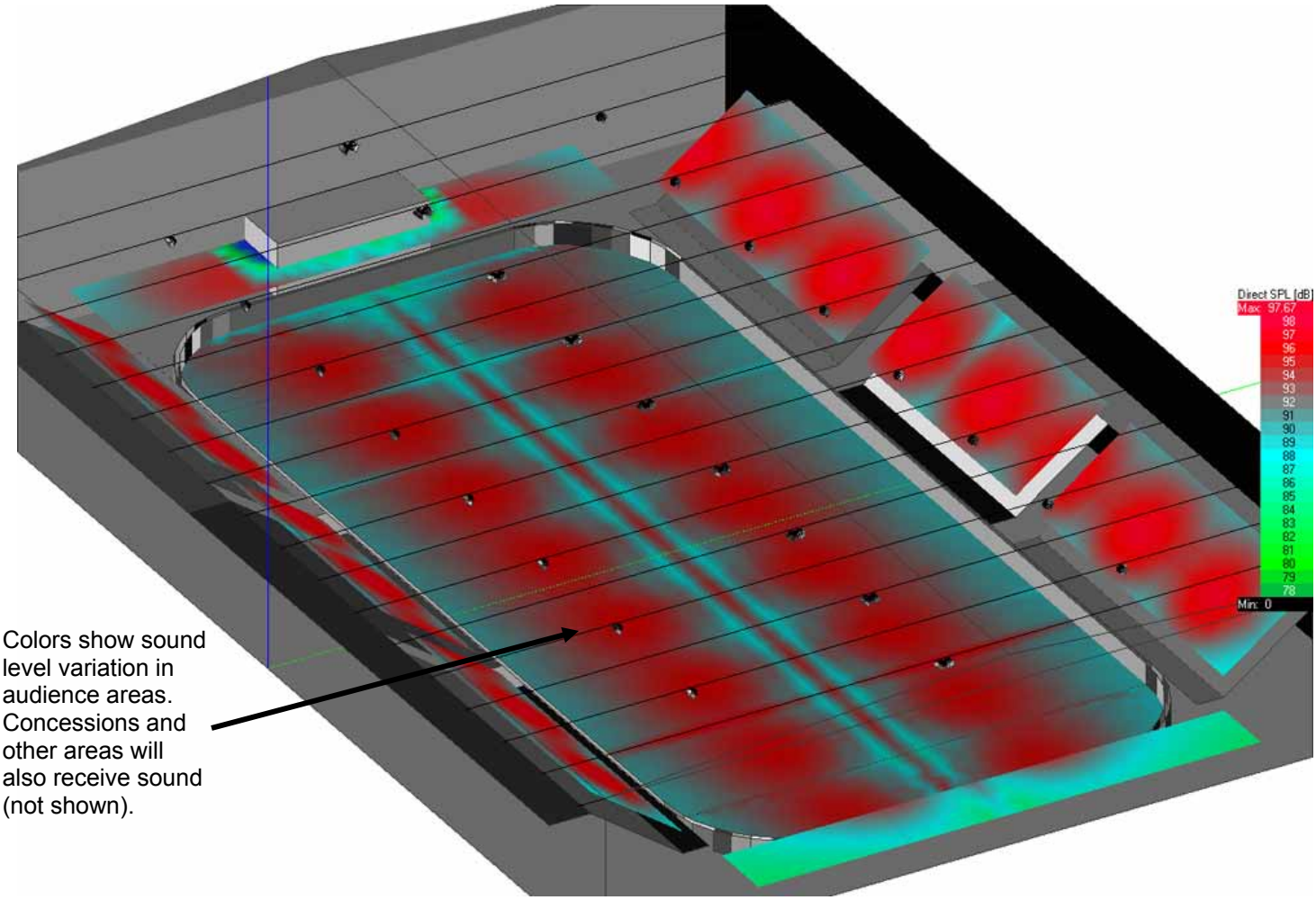
R-SERIES LOUDSPEAKERS USED IN THIS DESIGN

R.5

Qty	Model	Comments
16	R.5-94Z	For coverage of bleacher areas
30	R.5-99Z	For coverage of ice rink floor and concessions stand
System Cost Estimate - $$$$$		Based on cost comparison scale: $ = lower cost, $$$$$ = higher cost

INDOOR ICE RINK #2

SEMI-DISTRIBUTED SYSTEM ON ROOF BEAMS



Colors show sound level variation in audience areas. Concessions and other areas will also receive sound (not shown).

DISCUSSION

Ice Rink Acoustics

Designing a successful sound system for an indoor ice rink is a major challenge. Most, if not all, surfaces are hard and the typical facility has little or no absorption material to quiet the reverberation. This makes it difficult to design a system with good voice intelligibility. Also, patrons commonly want the system to be loud and musical for sporting events. Although it's easy to design a loud system, the facility acoustics make it difficult to achieve the "musical" goal.

One way to help meet these challenges is to specify absorption material to improve facility acoustics. Absorption material can be sprayed onto the ceiling and girders and absorption panels can be installed on the walls.

General System Design Concepts

There are two keys to improving intelligibility and getting good musical sound quality in a space like this. First, aim the loudspeakers at the listeners and, as much as possible, keep the sound away from the walls, floor and ceiling. Community R-Series loudspeakers can help in this goal because they provide excellent pattern control. Second, to the extent possible, keep the loudspeakers near the listeners. This improves the direct/reverberant ratio which improves intelligibility.

Semi-Distributed Ceiling System

Ice Rink #1 uses three rows of loudspeakers aimed downwards for floor (rink) coverage. In contrast, Ice Rink #2 uses only two rows to cover the same area. These two rows are in the center of the floor and aimed outwards to cover a wider area. Delay the rows covering the bleachers to synchronize with the sound from the two center rows.

This design will be less costly because it uses fewer loudspeakers but intelligibility will be slightly degraded for listeners on the floor. If the facility is a permanent ice rink and floor coverage is primarily for music for patrons' enjoyment, this may be an acceptable compromise in return for cost reduction. If the facility is a multi-purpose arena, consider the Ice Rink #1 system which is more versatile and provides better intelligibility on the floor.

Alternate Loudspeaker Choices and 70/100 Volt Systems

Add R2SUB loudspeakers for extended low frequency response when patrons want "rock and roll" musical performance. R.5 loudspeakers are available in 70/100-volt versions, as used in this example. However, if wire runs are short enough, it may be possible to use standard versions at a slightly lower cost. Choose amplifiers that are rated for the resulting very low impedance load.

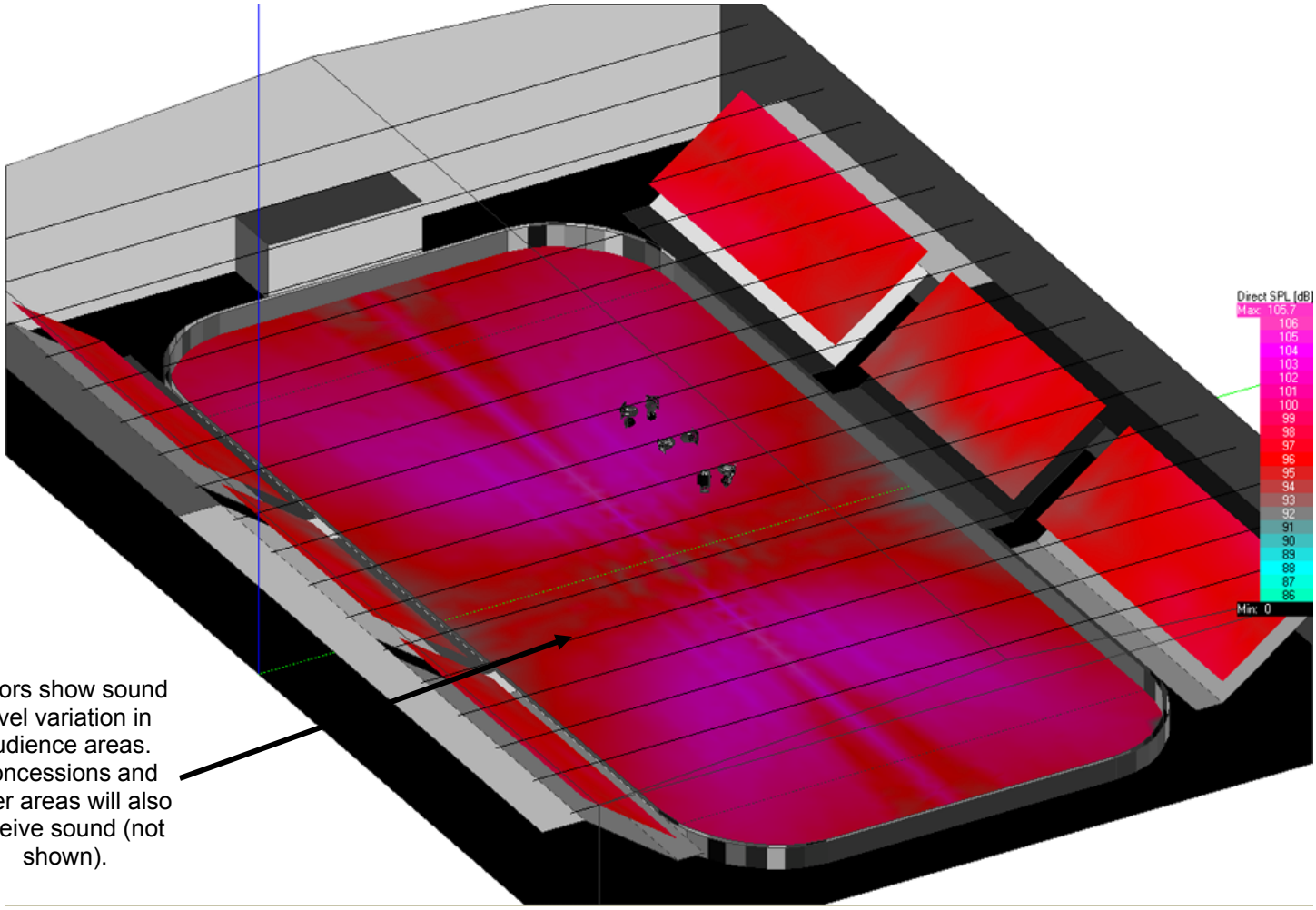
R-SERIES LOUDSPEAKERS USED IN THIS DESIGN

R.5

Qty	Model	Comments
16	R.5-94Z	For coverage of ice rink floor and concessions stand
18	R.5-99Z	For coverage of bleacher areas
System Cost Estimate - $$$$$		Based on cost comparison scale: $ = lower cost, $$$$$ = higher cost

INDOOR ICE RINK #3

POINT-SOURCE SYSTEM AT ARENA CENTER



Colors show sound level variation in audience areas. Concessions and other areas will also receive sound (not shown).

DISCUSSION

Ice Rink Acoustics

Designing a successful sound system for an indoor ice rink is a major challenge. Most, if not all, surfaces are hard and the typical facility has little or no absorption material to quiet the reverberation. This makes it difficult to design a system with good voice intelligibility. Also, patrons commonly want the system to be loud and musical for sporting events. Although it's easy to design a loud system, the facility acoustics make it difficult to achieve the "musical" goal.

One way to help meet these challenges is to specify absorption material to improve facility acoustics. Absorption material can be sprayed onto the ceiling and girders and absorption panels can be installed on the walls.

General System Design Concepts

There are two keys to improving intelligibility and getting good musical sound quality in a space like this. First, aim the loudspeakers at the listeners and, as much as possible, keep the sound away from the walls, floor and ceiling. Community R-Series loudspeakers can help in this goal because they provide excellent pattern control. Second, to the extent possible, keep the loudspeakers near the listeners. This improves the direct/reverberant ratio which improves intelligibility.

Point-Source System

A point-source system is usually the lowest-cost option for any facility. The point-source system in this example will provide ample level and excellent musical sound quality with acceptable voice intelligibility. In comparison, the Ceiling Distributed design (Indoor Ice Rink System #1) will provide better voice intelligibility and more flexibility for multipurpose use at somewhat higher cost.

Multi-Purpose Usage

The center-mounted loudspeakers will provide adequate floor coverage for non-ice-rink usage but this system is not designed for uses where an audience is sitting in chairs on the floor.

Alternate Loudspeaker Choices and 70/100 Volt Systems

The R2 loudspeakers used in this example are high-power devices that can easily produce "rock 'n' roll" levels in large gymnasiums. When level requirements are lower, consider the Community R1 loudspeaker series which offers excellent pattern control at a lower price.

Add R2SUBZ loudspeakers for extended low frequency response when students want "rock 'n' roll" musical performance. Mount the R2 subwoofers over the audience seating areas and apply signal delay to synchronize the R2SUBZ's output with the Point Source System's signal arrival. Refer to High School Gym design #3. Accessory 70/100-volt transformers are available for R2 loudspeakers. However, if wire runs are short enough, it may be possible to eliminate the transformers and reduce the system cost. Choose amplifiers that are rated for the resulting low impedance load. This example also shows an optional pair of R.5 loudspeakers used to cover end-zone seating.

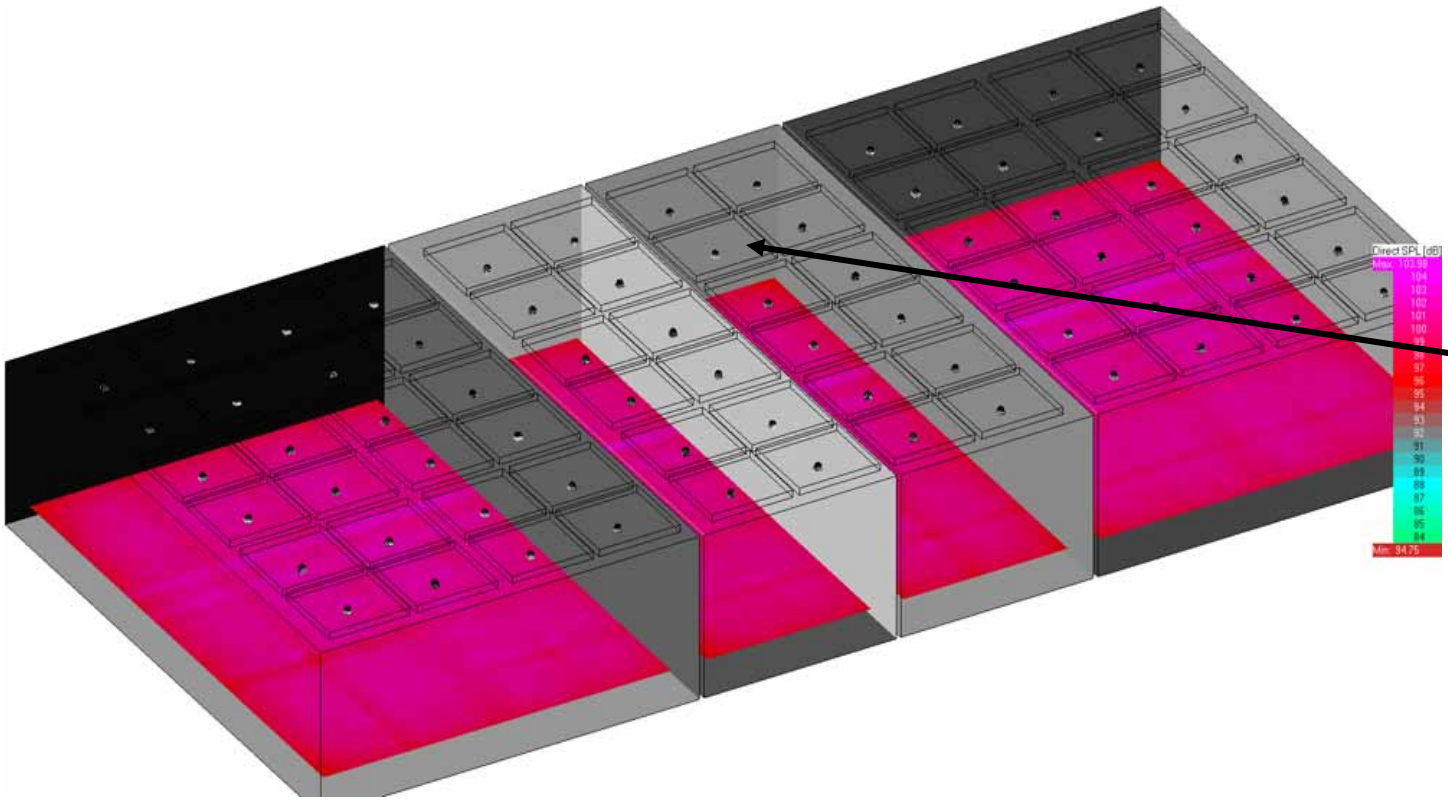
R-SERIES LOUDSPEAKERS USED IN THIS DESIGN

R.5HP

R2

Qty	Model	Comments
6	R2-52Z	For coverage of areas farther from the cluster
4	R.5HP	For coverage of areas near the cluster
System Cost Estimate - $$$$$		Based on cost comparison scale: $ = lower cost, $$$$$ = higher cost

CONVENTION CENTER
DISTRIBUTED CEILING SYSTEM IN
LARGE OPEN SPACE



DISCUSSION

Convention Center Acoustics

A convention center space may be carpeted and have some acoustic treatment at the ceiling. This reduces reverberation in comparison with a gymnasium or natatorium. However, the size of a space like this makes it a challenge to provide good voice intelligibility. Also, the space may need to be subdivided for multiple simultaneous events. These challenges are best met with a ceiling distributed loudspeaker system.

Distributed Ceiling System

A distributed system offers the best way to cover a space like this and makes it possible to subdivide the room into speaker zones. It puts the loudspeakers as close as possible to the listeners and aims them directly at the listeners, away from the walls and ceiling.

The loudspeaker layout could be easily calculated in Community's FORECASTER Ceiling System Software. This will save considerable design time over using EASE. Of course FORECASTER doesn't provide intelligibility estimates or detailed graphical coverage diagrams.

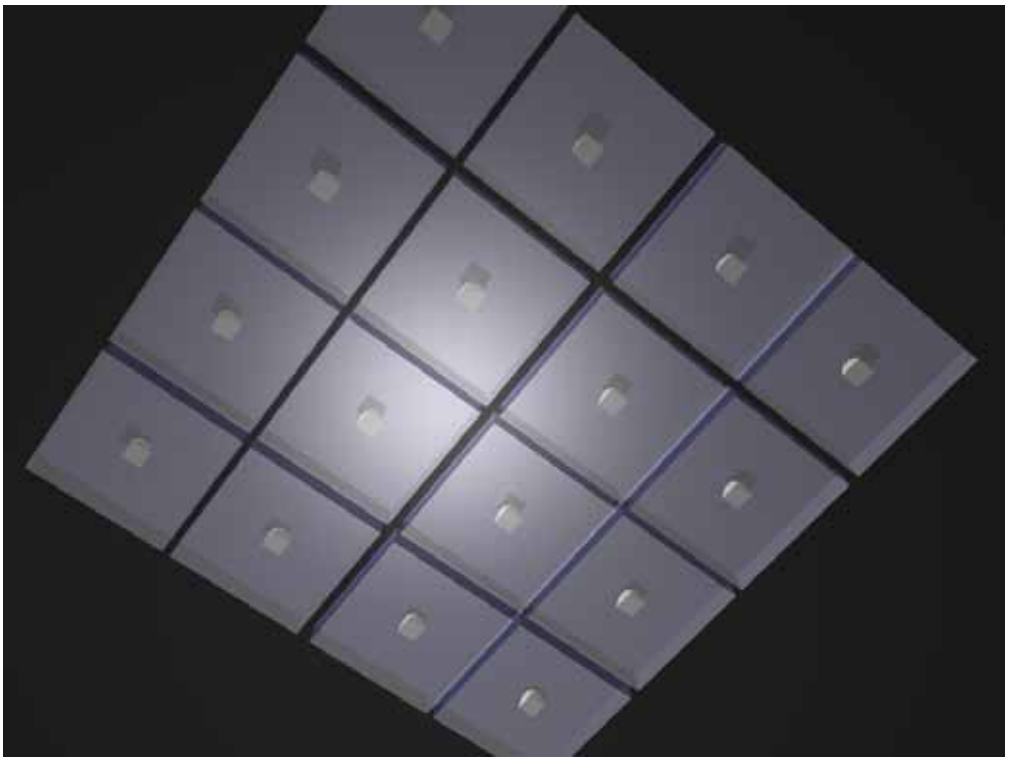
R-Series vs. CLOUD

This example system uses R.5COAX66T loudspeakers which have a symmetrical 60° x 60° coverage pattern and a 200-watt, 70V/100V autoformer. An alternate choice for this system would be CLOUD1266T loudspeakers with the C12BB3 back box and C12SQGRL grille. The CLOUD1266T has similar performance and a similar equipment price to the R.5COAX66T.

Although the CLOUD1266T is a more traditional choice for this type of system, the R.5COAX66T is an excellent choice because it comes assembled and includes a yoke bracket and attached connecting cable. These features may reduce

installation cost. Also, the R.5 can be ordered in a custom color at extra cost. Thus, the CLOUD1266T may be the right choice for a dropped ceiling system and the R.5COAX66T may be the right choice for an open ceiling.

Add R2SUBZ (or CLOUD12SUB) for extended low frequency response when patrons want "rock 'n' roll" musical performance.



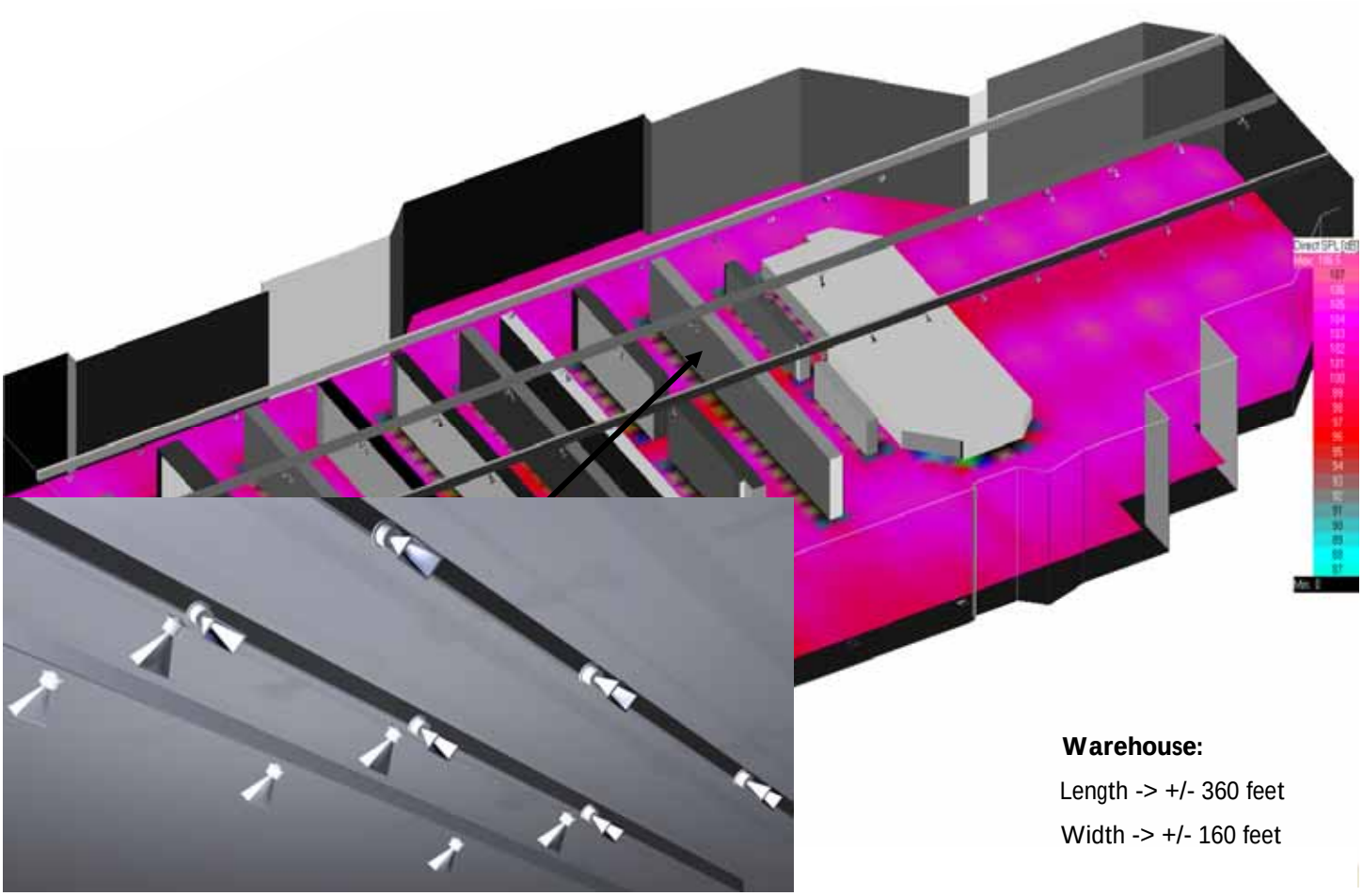
R-SERIES LOUDSPEAKERS USED IN THIS DESIGN

R.5COAX

Qty	Model	Comments
72	R.5COAX66T	For coverage of entire floor area
System Cost Estimate - $$$$$		Based on cost comparison scale: $ = lower cost, $$$$$ = higher cost

WAREHOUSE OR LARGE RETAIL STORE

DISTRIBUTED LINE SYSTEM



Warehouse:

Length -> +/- 360 feet

Width -> +/- 160 feet

DISCUSSION

Warehouse Acoustics and Layout

A large warehouse or retail store may have very little acoustic treatment. This means reverberation will be high. The size of a space like this and the noise of fork lift traffic and conveyor systems add to the challenge of providing good voice intelligibility.

These challenges are best met with a distributed loudspeaker system. However, in a warehouse, shelving may be very tall and aisles may be very narrow. Inventory on the shelving may block sound from the loudspeakers so that it doesn't reach adjacent aisles. The only solution to this problem is to add more loudspeakers so that every aisle is covered.

In a retail store, shelving may not be as high to allow customers to reach products they want to buy. In the case of a hardware store or home center, some merchandise may be reachable only by a ladder but it's unlikely that shelves will be as tall as those in a true warehouse.

Distributed Line vs. Distributed Ceiling System

A distributed system offers the best way to cover a space like this. It puts the loudspeakers as close as possible to the listeners and aims them away from the walls and ceiling. A distributed ceiling system would also work well in a space like this (loudspeakers facing straight downwards). A good choice for that type of system would be an R.5COAX as used in the Convention Center application on page 52.

For this warehouse application, however, we have chosen an alternate design which uses four rows of horn-type loudspeakers, facing downwards and outwards. The design starts with two, back-to-back lines of loudspeakers in the center and continues with two additional rows of loudspeakers at an appropriate distance from the center. These outer rows must be delayed to match the arrival time of sound from the center rows. This design uses fewer loudspeakers than a ceiling distributed system and the RMG-200A horn-type loudspeakers provide good control over coverage while maintaining a favorable direct/reverberant ratio.

This design still faces the challenge of blocked sound from shelving that reaches near the ceiling. The only solution to this problem is to add more loudspeakers.

To reduce cost, consider using one or two RSH-462s (depending on horizontal coverage needed) in place of the RMG-200As to cover the open area (top right of diagram).

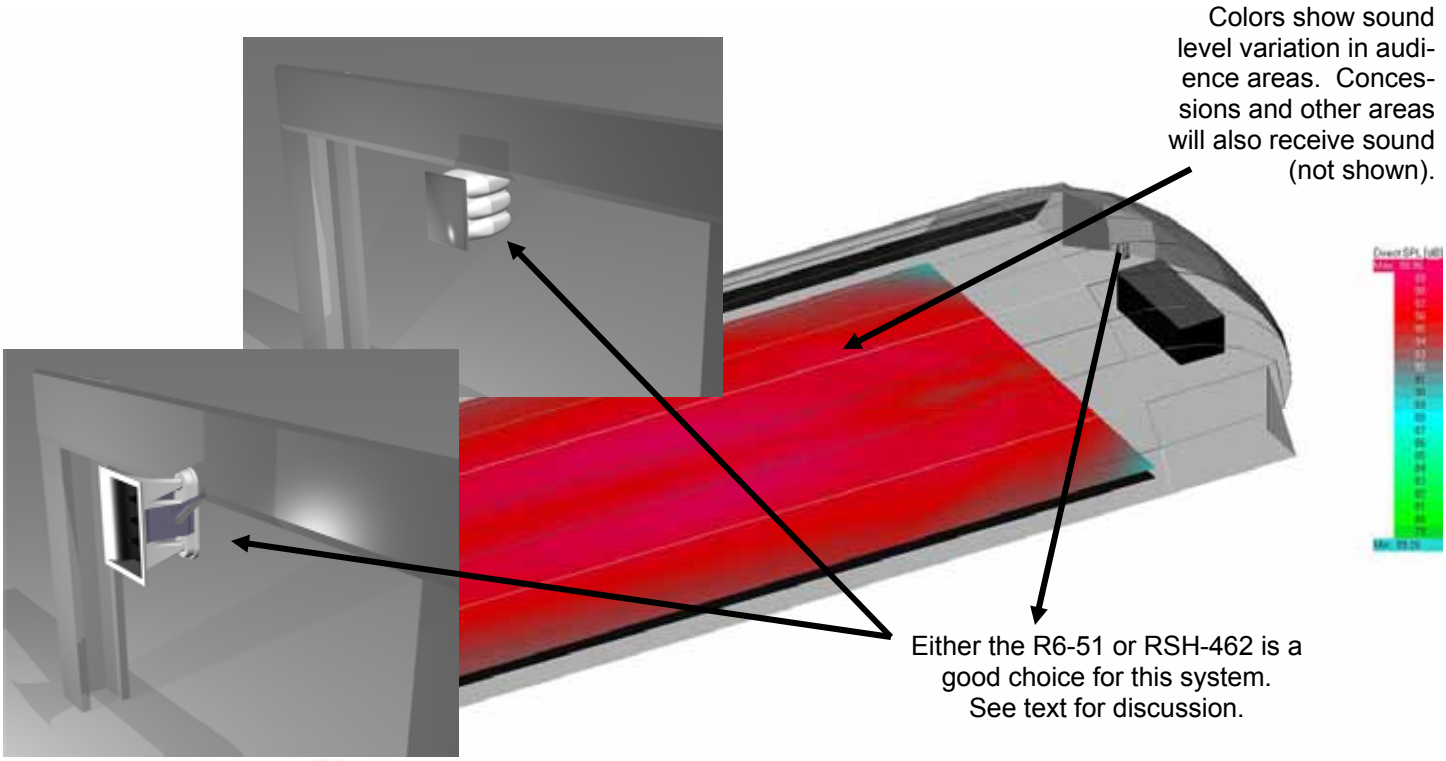
R-SERIES LOUDSPEAKERS USED IN THIS DESIGN

RMG-200AT

Qty	Model	Comments
62	RMG-200AT	For coverage of entire floor area
System Cost Estimate - $$$$$		Based on cost comparison scale: $ = lower cost, $$$$$ = higher cost

LARGE AIR-INFLATED STRUCTURE

POINT-SOURCE SYSTEM


Colors show sound level variation in audience areas. Concessions and other areas will also receive sound (not shown).
Either the R6-51 or RSH-462 is a good choice for this system. See text for discussion.

DISCUSSION

An air-inflated structure is a common way to enclose a large sports field on a semi-permanent basis. Tennis and swim-clubs may use this type of facility to enable patrons to enjoy their sports regardless of outside weather.

Because the air-inflated structure has very thin walls and ceiling, the acoustics will be very similar to outdoors. There will be almost no echoes or reverberation at low and mid-frequencies. However, there may be some unwanted reflections from the structure at high frequencies. For this reason, it's a good idea to aim the sound away from the walls and ceiling if possible. A horn-type loudspeaker can be helpful in reaching this goal.

Another audio challenge in an air-inflated structure is the lack of ceiling structural beams for loudspeaker locations. For this reason, a point-source, long-throw loudspeaker is often the only reasonable way to cover the patron areas.

We are showing two choices for coverage of this facility. The first is the RSH-462, a voice-range, horn-loaded loud-speaker system with excellent speech intelligibility and line-array type vertical pattern control to help keep the HF sound off the roof. The second is the R6-51, a full-range, horn-loaded loudspeaker with excellent speech intelligibility and great musical sound quality. The RSH-462 is a good choice for paging, sports announcing and other voice-range usage. The R6-51 is the right choice when patrons want full-range music along with announcing.

Feedback, Artificial Echoes and the Announcer's Echo

There's little chance of feedback in this design because the loudspeakers are some distance from the announcer's micro-phone. There will be an announcer's echo for announcers located at least 35 to 70 feet (11m-21m) from the loudspeaker. This could happen at a tennis match. See Page 9 for a discussion of these problems.

Neighborhood Spill

The thin walls will allow sound to escape the structure. Mount the loudspeakers as high as possible and aim them down at the field to minimize neighborhood spill.

Alternate Loudspeaker Choices and 70/100 Volt Systems

Add R2SUBZ or R6-BASSHORN loudspeakers for extended low frequency response. Because of their power levels, Community recommends that these loudspeakers be directly connected to their power amplifiers and not used on 70/100 -volt lines.

R-SERIES LOUDSPEAKERS USED IN THIS DESIGN

RSH-462

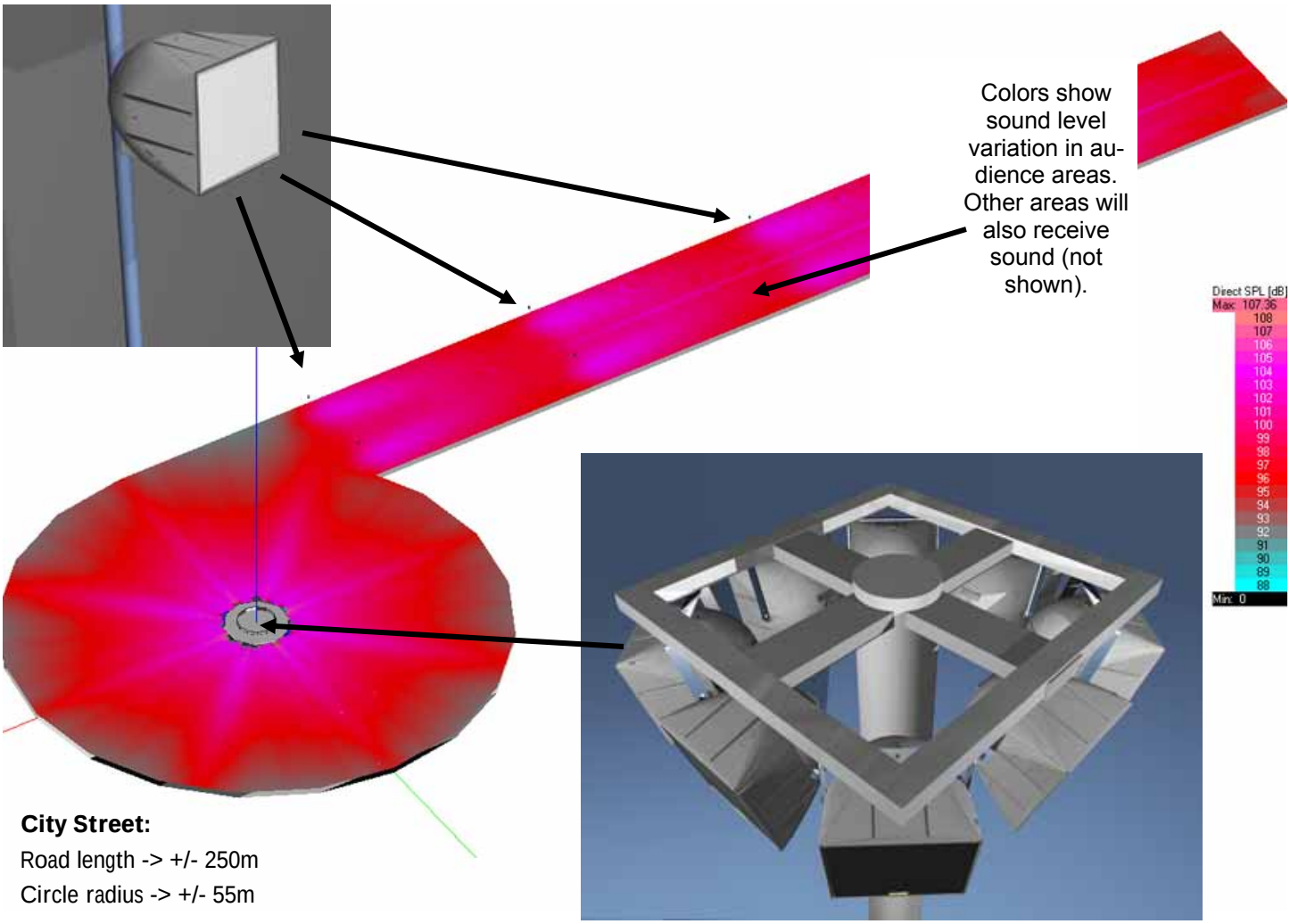
R6-51

Qty	Model	Comments for R6-51
1	R6-51	For coverage of entire facility
System Cost Estimate - $$		Based on cost comparison scale: $ = lowest price $$$$$ = highest price)

Qty	Model	Comments for RSH-462
1	RSH-462	For coverage of entire facility
System Cost Estimate - $		Based on cost comparison scale: $ = lower cost, $$$$$ = higher cost

CITY STREET / FESTIVAL SYSTEM

POINT-SOURCE AND DISTRIBUTED SYSTEM ON LIGHT POLES



City Street:

Road length -> +/- 250m

Circle radius -> +/- 55m

DISCUSSION

This design uses a central cluster in the circle with distributed loudspeakers on delay to cover the street and sidewalk. The result will be smooth and even coverage of the street and public areas with excellent sound quality and minimal neighborhood spill. The equipment cost is moderate and installation is relatively easy.

The design is very flexible making it easy to add coverage for additional public areas, concessions or music or dramatic performance areas. When possible, install the loudspeakers on light poles high enough to be out of easy reach of thieves and vandals.

Artificial Echoes, the Announcer Echo and Neighborhood Spill

The biggest problem with a wide-spread outdoor system like this is echoes, real and artificial. To avoid real echoes, try to aim the loudspeakers away from nearby buildings, stone walls and other reflecting surfaces. Artificial echoes are caused when a listener can hear two loudspeakers and the second loudspeaker is at least 35 to 70 feet (11m-21m) farther away than the first.

There are two primary methods of avoiding this problem. First, mount the loudspeakers in positions that prevent a listener from hearing two loudspeakers at once. The best way to achieve this is to mount the loudspeakers high in the air and point them downwards. Second, mount the loudspeakers close together so that, if a listener can hear two loudspeakers, the second loudspeaker is no more than about 50 feet (15m) farther away from the first loudspeaker.

An alternate design for the circle area would place the loudspeakers on light poles around the outside of the circle facing inwards. Avoid this design if possible because listeners near the outside of the circle will almost certainly hear several loudspeakers resulting in multiple artificial echoes.

For the road approaching the circle area, put R.5HPT on the light poles facing downwards and outwards (away from the circle). Add progressive delay to these loudspeakers to synchronize the sound with spill from the circle.

An announcer or performer in the center of the circle will not hear an artifical echo so this is a good design for outdoor performances. Neighborhood spill from this system will be minimized if the loudspeakers are placed high on the poles and pointed downwards to cover only the public areas. For the central area, avoid placing the speakers higher than 40 feet (12m) to maintain a natural sound for performers.

Alternate Loudspeaker Choices and 70/100 Volt Systems

Add R2SUBZ loudspeakers for extended low frequency response. This design uses "T" model loudspeakers which include 70V/100V autoformers to reduce line losses and allow smaller gauge wire.

R-SERIES LOUDSPEAKERS USED IN THIS DESIGN

R.5HP

Qty	Model	Comments
8	R.5HPT	For traffic circle area
8	R.5HPT	For pedestrian walk-way
System Cost Estimate - $$$$		Based on cost comparison scale: $ = lower cost, $$$$$ = higher cost

Community Professional Loudspeakers

333 East Fifth Street, Chester, PA 19013-4511 USA

TEL: 1-610-876-3400 · 1-800-523-4934 FAX: 1-610-874-0190

email: tagteam@communitypro.com

www.communitypro.com

RSAG081108